CHAPTER 36

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 36

PNEUMATIC SYSTEM

LIST OF EFFECTIVE PAGES

CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
List of Effective Pages	1	Dec 15/95	
	2	Dec 15/95	
	3	Dec 15/95	
	4	Dec 15/95	
	5	Dec 15/95	
	6	Dec 15/95	
	7/8	Dec 15/95	
Table of Contents	1	Nov 15/87	
	2	Nov 15/86	
	3	Nov 15/86	
	4	Nov 15/86	
	5	May 15/82	
	6	Nov 15/86	
	7	Nov 15/86	
	8	Nov 15/86	
	9	Nov 15/85	
	10	Nov 15/86	
	11/12	May 15/87	
36-conts	1	Nov 15/88	
36-conts	2	Jun 15/92	
36-conts	3	Jun 15/92	
36-conts	4	Jun 15/94	
36-DIAGM	1	Jul 15/84	
36-DIAGM	2	Jul 15/84	
36-DIAGM	3	May 15/87	
36-DIAGM	4	Jul 15/84	
36-DIAGM	5	Jul 15/84	
36-DIAGM	6	Jul 15/84	
36-DIAGM	7	Jul 15/84	
36-DIAGM	8	Jul 15/84	
36-DIAGM	9	Nov 15/89	
36-DIAGM	10	Nov 15/86	
36-DIAGM	11	Nov 15/89	
36-DIAGM	12	May 15/86	
36-INDEX	1	Jun 15/93	
36-INDEX	2	Jun 15/93	
36-INDEX	3	Nov 15/89	
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36-INDEX	5	May 15/86	
36-INDEX	6	May 15/86	
36-INDEX	7	May 15/86	
36-INDEX	8	May 15/86	
36-INDEX	9	May 15/89	
36-INDEX	10	Nov 15/89	
36-INDEX	11	May 15/86	
36-INDEX	12	May 15/86	
36-INDEX	13	May 15/86	
36-INDEX	14	May 15/86	
36-INDEX	15	May 15/86	
36-INDEX	16	May 15/86	
36-INDEX	17	Nov 15/86	
36-INDEX	18	May 15/87	
36-INDEX	19	May 15/86	
36-INDEX	20	May 15/86	
36-INDEX	21/22	May 15/86	
36-00-00	1	Jun 15/80	
36-00-00	2	Mar 15/80	
36-00-00	3	Jul 15/84	
36-00-00	4	Jul 15/84	
36-00-00	5/6	Jul 15/84	
36-00-00	7/8	Aug 15/81	
36-00-00	9/10	Aug 15/81	
36-00-00	11/12	Nov 15/78	
36-00-00	13/14	Aug 15/81	
36-00-00	15/16	Aug 15/81	
36-00-00	17	Aug 15/81	
36-00-00	18	Aug 15/81	
36-00-00	19/20	Aug 15/81	
36-00-00	21	Aug 15/81	
36-00-00	22	Aug 15/81	
36-00-00	23/24	May 15/85	
36-00-00	201	Mar 15/80	
36-00-00	202	Mar 15/80	
36-00-00	203	Jul 15/84	
36-00-00	204	May 15/82	
36-00-00	205	May 15/82	
36-00-00	206	Nov 15/88	
36-00-00	207	Nov 15/88	
36-00-00	208	Nov 15/88	
36-00-00	601	Nov 15/87	
36-00-00	602	Nov 15/87	
36-00-00	603/604	Nov 15/87	

CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
36-00-00	701	Jul 15/84	
36-00-00	702	May 15/85	
36-00-00	703	May 15/85	
36-00-00	704	May 15/85	
R 36-00-01	401	Dec 15/95	
36-00-01	402	Jun 15/80	
36-00-01	403	Jun 15/80	
36-00-01	404	Aug 15/81	
36-00-01	405/406	Aug 15/81	
36-00-01	407/408	Aug 1/72	
36-10-00	1/2	Feb 15/76	
36-11-00	1	Jul 15/84	
36-11-00	2	Jul 15/84	
36-11-00	3/4	Aug 15/82	
36-11-00	5/6	May 15/87	
36-11-00	7	Jun 15/73	
36-11-00	8	Jul 15/84	
36-11-00	9	Nov 15/81	
36-11-00	10	Nov 15/81	
36-11-00	11/12	May 15/82	
36-11-00	13/14	May 15/82	
36-11-00	15/16	Nov 15/81	
36-11-00	17/18	Aug 15/82	
36-11-00	19	May 15/82	
36-11-00	20	Nov 15/81	
36-11-00	21	Jul 15/84	
36-11-00	22	Nov 15/81	
36-11-00	23	Jul 15/84	
36-11-00	24	Nov 15/81	
36-11-00	25	Jul 15/84	
36-11-00	26	May 15/90	
36-11-00	27	Dec 15/91	
36-11-00	28	Nov 15/81	
36-11-00	29	Nov 15/81	
36-11-00	30	Nov 15/81	
36-11-00	31	Nov 15/81	
36-11-00	32	Aug 15/82	
36-11-00	33	Jul 15/84	
36-11-00	34	Jul 15/84	
36-11-00	35/36	Nov 15/81	
36-11-00	37	Nov 15/81	
36-11-00	38	Jul 15/84	
36-11-00	101	May 15/82	
36-11-00	102	Mar 15/81	
36-11-00	103	Mar 15/81	
36-11-00	104	Mar 15/81	
36-11-00	105	Mar 15/81	
36-11-00	106	Mar 15/81	
36-11-00	107	Mar 15/81	
36-11-00	108	Mar 15/81	
36-11-00	109	Mar 15/81	
36-11-00	110	Mar 15/81	
36-11-00	111	Mar 15/81	
36-11-00	112	Mar 15/81	
36-11-00	113	Mar 15/81	
36-11-00	114	Nov 15/81	
36-11-00	115	Mar 15/81	
36-11-00	116	Mar 15/81	
36-11-00	117/118	Mar 15/81	
36-11-00	119/120	Nov 15/81	
36-11-00	121/122	Aug 15/82	
36-11-00	123	Nov 15/81	
36-11-00	124	Nov 15/81	
36-11-00	125	Nov 15/87	
36-11-00	126	Nov 15/86	
36-11-00	127	Nov 15/86	
36-11-00	128	May 15/88	
36-11-00	129	Nov 15/86	
36-11-00	130	May 15/87	
36-11-00	131	Nov 15/8	
36-11-00	132	Nov 15/86	
36-11-00	133	Nov 15/86	
36-11-00	134	Nov 15/86	
36-11-00	135	Nov 15/88	
36-11-00	136	Nov 15/88	
36-11-00	137/138	May 15/88	
36-11-00	139/140	May 15/88	
36-11-00	141/142	May 15/88	
36-11-00	143/144	May 15/88	
36-11-00	145/146	May 15/88	
36-11-00	147/148	May 15/88	
36-11-00	149/150	May 15/88	
36-11-00	151/152	May 15/88	
36-11-00	153/154	May 15/88	
36-11-00	155/156	May 15/88	
36-11-00	157/158	May 15/88	
36-11-00	159/160	May 15/88	
36-11-00	161/162	May 15/88	
36-11-00	163/164	May 15/88	
36-11-00	165/166	May 15/88	
36-11-00	167/168	May 15/88	
36-11-00	169/170	May 15/88	
36-11-00	171/172	May 15/88	
36-11-00	501	Jun 15/93	
36-11-00	502	Jun 15/93	
36-11-00	503	Jun 15/93	

CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
36-11-00	504	Jun 15/93	
36-11-00	505	Jun 15/93	
36-11-00	506	Jun 15/93	
36-11-00	507/508	Jun 15/93	
36-11-01	201	Feb 15/82	
36-11-01	202	Feb 15/82	
36-11-01	203/204	Feb 15/82	
36-11-01	401	Dec 15/91	
36-11-01	402	Dec 15/91	
36-11-01	403	Feb 15/82	
36-11-01	404	Dec 15/91	
36-11-01	405	Nov 15/81	
36-11-01	406	Feb 15/82	
36-11-01	407	Feb 15/82	
36-11-01	408	Dec 15/80	
36-11-01	409/410	Feb 15/82	
36-11-01	411/412	Jun 15/80	
36-11-04	201	Nov 15/83	
36-11-04	202	Nov 15/83	
36-11-04	401	Jul 15/84	
36-11-04	402	Jul 15/84	
36-11-04	403/404	Jul 15/84	
36-11-08	201/202	Aug 15/78	
36-11-08	401	Feb 15/82	
36-11-08	402	Feb 15/82	
36-11-08	403	Nov 15/83	
36-11-08	404	Nov 15/83	
36-11-08	405	Nov 15/83	
36-11-08	406	Nov 15/83	
36-11-08	407	Nov 15/83	
36-11-08	408	Nov 15/83	
36-11-08	409/410	Nov 15/86	
36-11-08	411	Jun 15/80	
36-11-08	412	May 15/90	
36-11-08	501	May 15/90	
36-11-08	502	Nov 15/82	
36-11-08	503	Nov 15/88	
36-11-08	504	May 15/90	
36-11-08	505	Nov 15/81	
36-11-08	506	Nov 15/88	
36-11-08	507/508	Nov 15/88	
36-11-08	509	Nov 15/88	
36-11-08	510	Nov 15/88	
36-11-08	511/512	May 15/90	
36-11-08	601/602	Jun 15/93	
36-11-08	701/702	Dec 15/79	
36-11-11	201/202	Sep 15/79	
36-11-11	401	Dec 15/79	
36-11-11	402	Aug 15/82	
36-11-11	403	Aug 15/82	
36-11-11	404	Dec 15/79	
36-11-11	501	Jan 15/73	
36-11-11	502	Nov 15/82	
36-11-11	503/504	Nov 15/82	
36-11-14	201	May 15/85	
36-11-14	202	May 15/85	
36-11-14	401	Sep 15/79	
36-11-14	402	Jun 15/80	
36-11-14	403	May 15/74	
36-11-14	404	Feb 15/74	
36-11-14	501/502	Jun 15/80	
36-11-18	201	Jul 15/83	
36-11-18	202	Jul 15/83	
36-11-18	203	Jul 15/83	
36-11-18	204	Jul 15/83	
36-11-18	401	Jul 15/84	
36-11-18	402	Jul 15/84	
36-11-18	403	Jul 15/84	
36-11-18	404	Jul 15/84	
36-11-18	405	Jul 15/84	
36-11-18	406	Jul 15/84	
36-11-18	407	Jul 15/84	
36-11-18	408	Jul 15/84	
36-11-18	501	May 15/82	
36-11-18	502	May 15/82	
36-11-18	503	May 15/82	
36-11-18	504	May 15/82	
36-11-18	505	May 15/82	
36-11-18	506	Jul 15/84	
36-11-18	507/508	Jul 15/84	
36-11-18	601/602	Feb 15/79	
36-11-18	701/702	Dec 15/79	
36-11-22	401	Nov 15/89	
36-11-22	402	Nov 15/89	
36-11-22	403	Nov 15/89	
36-11-22	404	May 15/82	
36-11-22	601	Feb 15/82	
36-11-22	602	Feb 15/82	
36-11-27	401	Nov 15/87	
36-11-27	402	Dec 1/71	
36-11-27	403/404	Nov 15/87	
36-11-33	401	Dec 15/91	
36-11-33	402	Dec 15/91	
36-11-33	403	Nov 15/81	
36-11-33	404	Sep 15/79	
36-11-33	405/406	Sep 15/79	

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36-11-36	402	Sep 15/79	
36-11-40	401	May 15/89	
36-11-40	402	May 15/89	
36-11-40	403	May 15/89	
36-11-40	404	May 15/89	
36-11-40	405/406	May 15/89	
36-11-41	401	Aug 15/81	
36-11-41	402	Dec 15/79	
36-11-41	403	Feb 15/74	
36-11-41	404	Feb 15/74	
36-11-41	405	May 15/89	
36-11-41	406	Dec 15/79	
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36-11-41	504	Nov 15/87	
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36-11-41	701/702	Feb 15/79	
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36-11-44	401	Dec 15/91	
36-11-44	402	Dec 15/79	
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36-11-44	501	Dec 15/91	
36-11-44	502	May 15/82	
36-11-44	503/504	May 15/82	
36-11-44	505/506	May 15/82	
36-11-47	401	Dec 15/79	
36-11-47	402	Dec 15/79	
36-11-47	403/404	May 15/74	
36-11-47	405/406	Sep 15/73	
36-11-47	407/408	Dec 15/79	
36-11-51	401	Aug 15/81	
36-11-51	402	Aug 15/81	
36-11-51	403	Sep 15/79	
36-11-51	404	Aug 15/81	
36-11-51	405/406	Sep 15/79	
36-11-51	407/408	Sep 15/79	
36-11-51	409	Aug 15/81	
36-11-51	410	Aug 15/81	
36-11-53	401	Nov 15/81	
36-11-53	402	Aug 15/82	
36-11-53	403	Nov 15/81	
36-11-53	404	Dec 15/79	
36-11-53	405/406	Dec 15/79	
36-12-00	1	Feb 15/78	
36-12-00	2	Mar 15/81	
36-12-00	3	Mar 15/81	
36-12-00	4	Mar 15/81	
36-12-00	5/6	Mar 15/81	
36-12-02	201	Nov 15/81	
36-12-02	202	Nov 15/81	
36-12-02	203/204	Feb 15/78	
36-12-02	401	Nov 15/81	
36-12-02	402	Nov 15/81	
36-12-02	403	Feb 15/78	
36-12-02	404	Nov 15/81	
36-12-02	405	Dec 15/79	
36-12-02	406	Nov 15/81	
36-12-02	501	Aug 15/81	
36-12-02	502	Aug 15/81	
36-12-02	503	Aug 15/81	
36-12-02	504	Feb 15/78	
36-12-02	601/602	Aug 15/81	
36-12-02	701/702	Feb 15/78	
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36-13-00	2	Dec 1/71	
36-13-00	3/4	Nov 15/82	
36-13-01	401	Sep 15/79	
36-13-01	402	Dec 1/71	
36-13-01	403/404	Sep 15/79	
36-14-00	1	Jul 15/83	
36-14-00	2	Jul 15/83	
36-14-00	3/4	Nov 15/85	
36-14-00	5/6	May 15/85	
36-14-00	7/8	Jul 15/83	
36-14-00	9/10	Jul 15/83	
36-14-00	11/12	Jul 15/83	
36-14-00	13/14	Jul 15/83	
36-14-00	15	Jul 15/83	
36-14-00	16	Jul 15/83	
36-14-00	17	Jul 15/83	
36-14-00	18	May 15/85	
36-14-00	19/20	May 15/85	
36-14-00	21/22	Nov 15/85	
36-14-00	23/24	Nov 15/86	
36-14-00	25/26	Mar 15/91	
36-14-00	27/28	Nov 15/85	
36-14-00	29/30	Nov 15/85	
36-14-00	31/32	Nov 15/86	
36-14-00	33/34	Nov 15/86	
36-14-00	35	Mar 15/91	
36-14-00	36	Nov 15/86	
36-14-00	37	Nov 15/85	

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36-14-00	39	Nov 15/85	
36-14-00	40	Nov 15/86	
36-14-00	41	Nov 15/86	
36-14-00	42	Nov 15/85	
36-14-00	43	Nov 15/86	
36-14-00	44	Nov 15/85	
36-14-00	45	Nov 15/86	
36-14-00	46	Nov 15/86	
36-14-00	101	Mar 15/81	
36-14-00	102	Mar 15/81	
36-14-00	103	May 15/85	
36-14-00	104	May 15/85	
36-14-00	105	Nov 15/85	
36-14-00	106	May 15/87	
36-14-00	107	May 15/85	
36-14-00	108	May 15/85	
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36-14-00	113	Nov 15/88	
36-14-00	114	Nov 15/85	
36-14-00	115	May 15/87	
36-14-00	116	May 15/90	
36-14-00	117	Nov 15/88	
36-14-00	118	Nov 15/88	
36-14-00	119/120	May 15/85	
36-14-00	121/122	Jun 15/92	
36-14-00	123/124	Jun 15/92	
36-14-00	125	Jun 15/92	
36-14-00	126	Jun 15/92	
36-14-00	127/128	Jun 15/92	
36-14-00	129/130	Jun 15/92	
36-14-00	131/132	Jun 15/92	
36-14-00	133	Jun 15/92	
36-14-00	134	Jun 15/92	
36-14-00	135/136	Jun 15/92	
36-14-00	137/138	Jun 15/92	
36-14-00	139/140	Jun 15/92	
36-14-00	141	Jun 15/92	
36-14-00	142	Jun 15/92	
36-14-01	201	May 15/85	
36-14-01	202	May 15/85	
36-14-01	401	Nov 15/81	
36-14-01	402	Nov 15/86	
36-14-01	403	Nov 15/81	
36-14-01	404	Nov 15/82	
36-14-01	405/406	Nov 15/86	
36-14-01	501	May 15/75	
36-14-01	502	May 15/75	
36-14-01	503/504	May 15/75	
36-14-01	601/602	Feb 15/78	
36-14-01	701/702	Feb 15/78	
36-14-02	201/202	May 15/74	
36-14-02	401	Nov 15/81	
36-14-02	402	Nov 15/81	
36-14-02	403	Nov 15/74	
36-14-02	404	Nov 15/81	
36-14-02	405	Nov 15/81	
36-14-02	406	Nov 15/81	
36-14-02	501	Nov 15/83	
36-14-02	502	Nov 15/83	
36-14-06	401	Dec 15/91	
36-14-06	402	Dec 15/91	
36-14-06	403/404	Sep 15/79	
36-14-08	401	Dec 15/91	
36-14-08	402	Aug 15/74	
36-14-08	403/404	Dec 15/91	
36-14-09	401	Dec 15/91	
36-14-09	402	Dec 15/91	
36-14-09	403/404	Dec 15/91	
36-14-10	401	Sep 15/79	
36-14-10	402	Dec 1/71	
36-14-10	403/404	Sep 15/79	
36-14-14	401	Nov 15/88	
36-14-14	402	Dec 15/91	
36-14-14	403	Nov 15/85	
36-14-14	404	Nov 15/85	
36-14-14	405/406	Dec 15/91	
36-14-17	401	Nov 15/88	
36-14-17	402	May 15/86	
36-14-17	403	May 15/86	
36-14-17	404	May 15/86	
36-14-17	405	May 15/86	
36-14-17	406	May 15/86	
36-14-18	401	Nov 15/88	
36-14-18	402	Aug 15/81	
36-14-18	403/404	Aug 15/81	
36-14-23	401	Sep 15/79	
36-14-23	402	Jan 15/72	
36-14-23	403/404	Sep 15/79	
36-14-24	401	Nov 15/85	
36-14-24	402	Nov 15/85	
36-14-24	403/404	Nov 15/85	
36-14-24	501	Nov 15/85	

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36-14-24	502	Nov 15/85	
36-14-24	503	Nov 15/85	
36-14-24	504	Nov 15/85	
36-14-24	505	Nov 15/85	
36-14-24	506	Nov 15/85	
36-14-25	401	Nov 15/86	
36-14-25	402	Nov 15/86	
36-14-25	403	Nov 15/86	
36-14-25	404	Nov 15/86	
36-14-25	405	Nov 15/86	
36-14-25	406	Nov 15/86	
36-14-26	401	Feb 15/82	
36-14-26	402	Feb 15/82	
36-14-26	403	Feb 15/82	
36-14-26	404	Feb 15/82	
36-14-26	405	Nov 15/89	
36-14-26	406	Feb 15/82	
36-21-00	1	Mar 15/83	
36-21-00	2	Mar 15/83	
36-21-01	401	Jan 15/73	
36-21-01	402	Jan 15/72	
36-21-02	401	Sep 15/79	
36-21-02	402	Mar 15/73	
36-21-02	403/404	Aug 15/82	
36-21-03	401	Sep 15/79	
36-21-03	402	Jan 15/72	
36-21-03	403/404	Aug 15/82	
36-22-00	1	Feb 15/82	
36-22-00	2	Mar 15/91	
36-22-00	3	Mar 15/91	
36-22-00	4	Nov 15/85	
36-22-00	5	Jul 15/83	
36-22-00	6	Jul 15/83	
36-22-00	7	Jul 15/83	
36-22-00	8	Jul 15/83	
36-22-00	9	Nov 15/85	
36-22-00	10	Nov 15/85	
36-22-00	11/12	Mar 15/91	
36-22-00	13/14	Aug 15/82	
36-22-00	15/16	Aug 15/82	
36-22-00	17/18	Aug 15/82	
36-22-00	19/20	Aug 15/82	
36-22-00	21/22	Aug 15/82	
36-22-00	23/24	Aug 15/82	
36-22-00	25	Mar 15/85	
36-22-00	26	Aug 15/82	
36-22-00	27/28	Aug 15/82	
36-22-00	101	Nov 15/81	
36-22-00	102	May 15/88	
36-22-00	103	May 15/88	
36-22-00	104	May 15/88	
36-22-00	105	May 15/88	
36-22-00	106	May 15/88	
36-22-00	107	Nov 15/83	
36-22-00	108	Nov 15/83	
36-22-00	109	Nov 15/81	
36-22-00	110	Jun 15/94	
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PNEUMATIC SYSTEM

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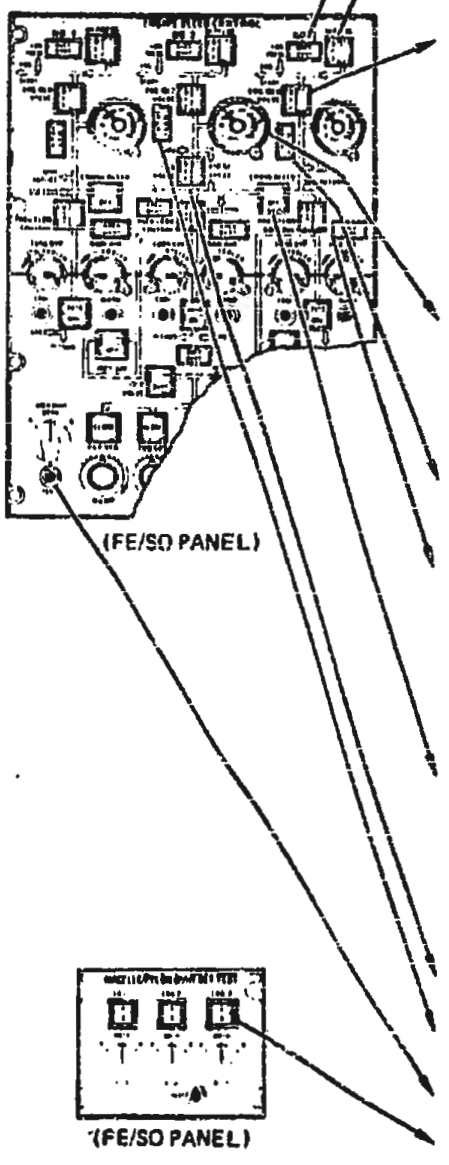
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POWERPLANT IN-FLIGHT RELIGHT
POWERPLANT ENGINE ISOLATION VALVE
ENGINE BLEED AIR PRESSURE
CROSSBLEED START POWERPLANT HOT START
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CROSSBLEED VALVE OR AFT ISOLATION VALVE
AREA OVHT, BLEED AIR (J)
AREA OVHT TEST
NACELLE/PYLON OVERHEAT DETECTION
(FE/SO PANEL)
(FE/SO PANEL)

TITLE	CHAP/SEC
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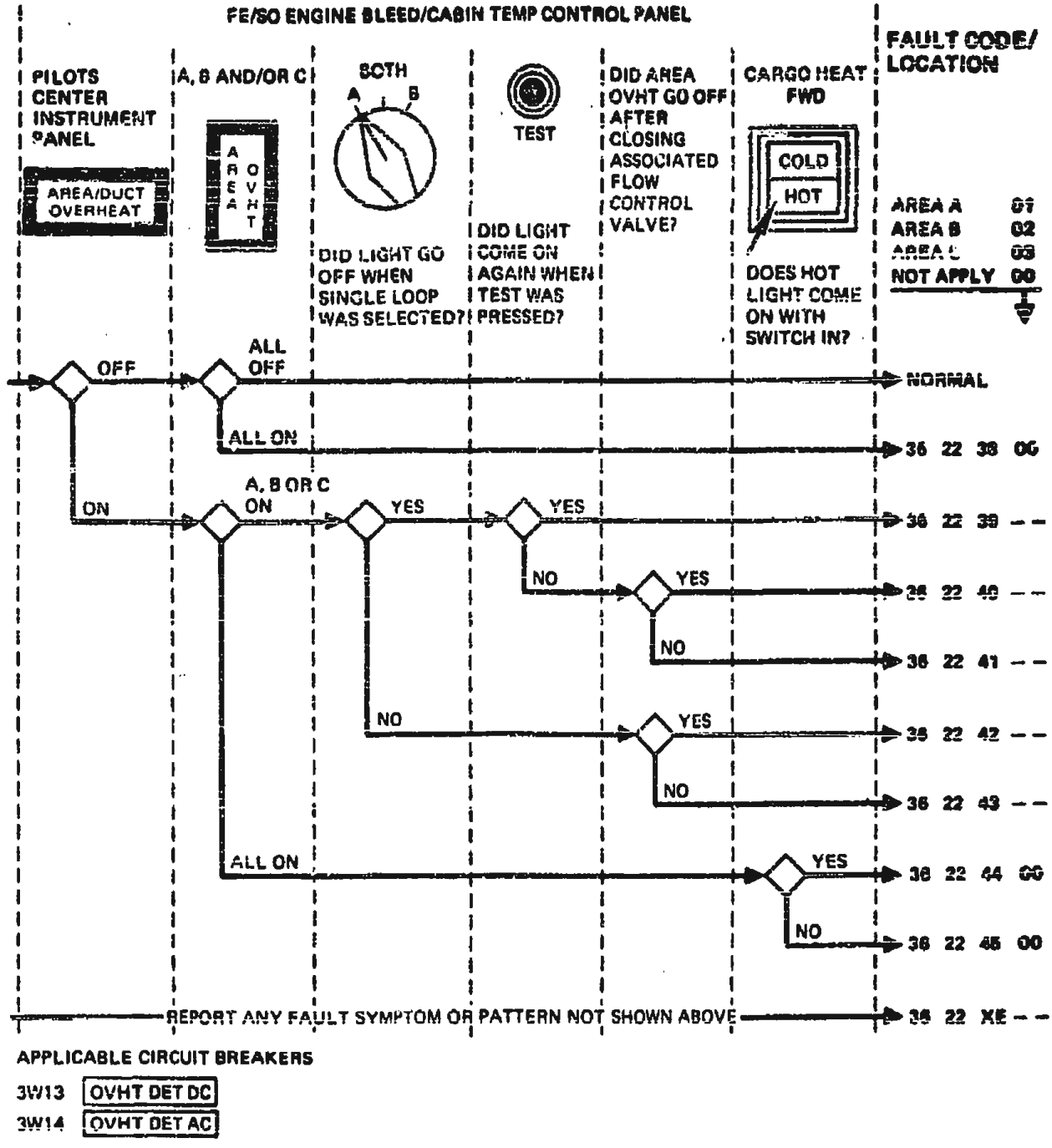
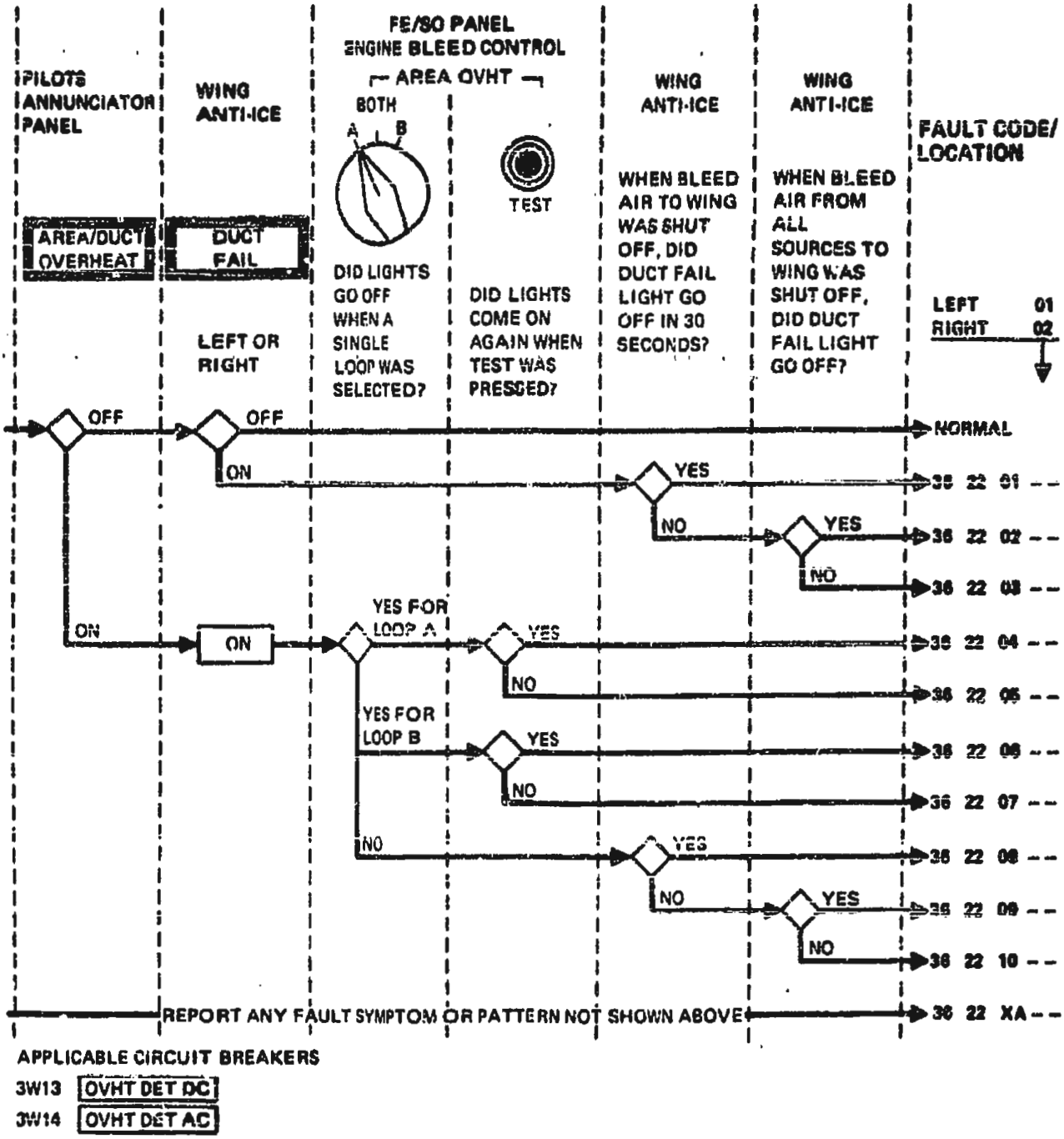


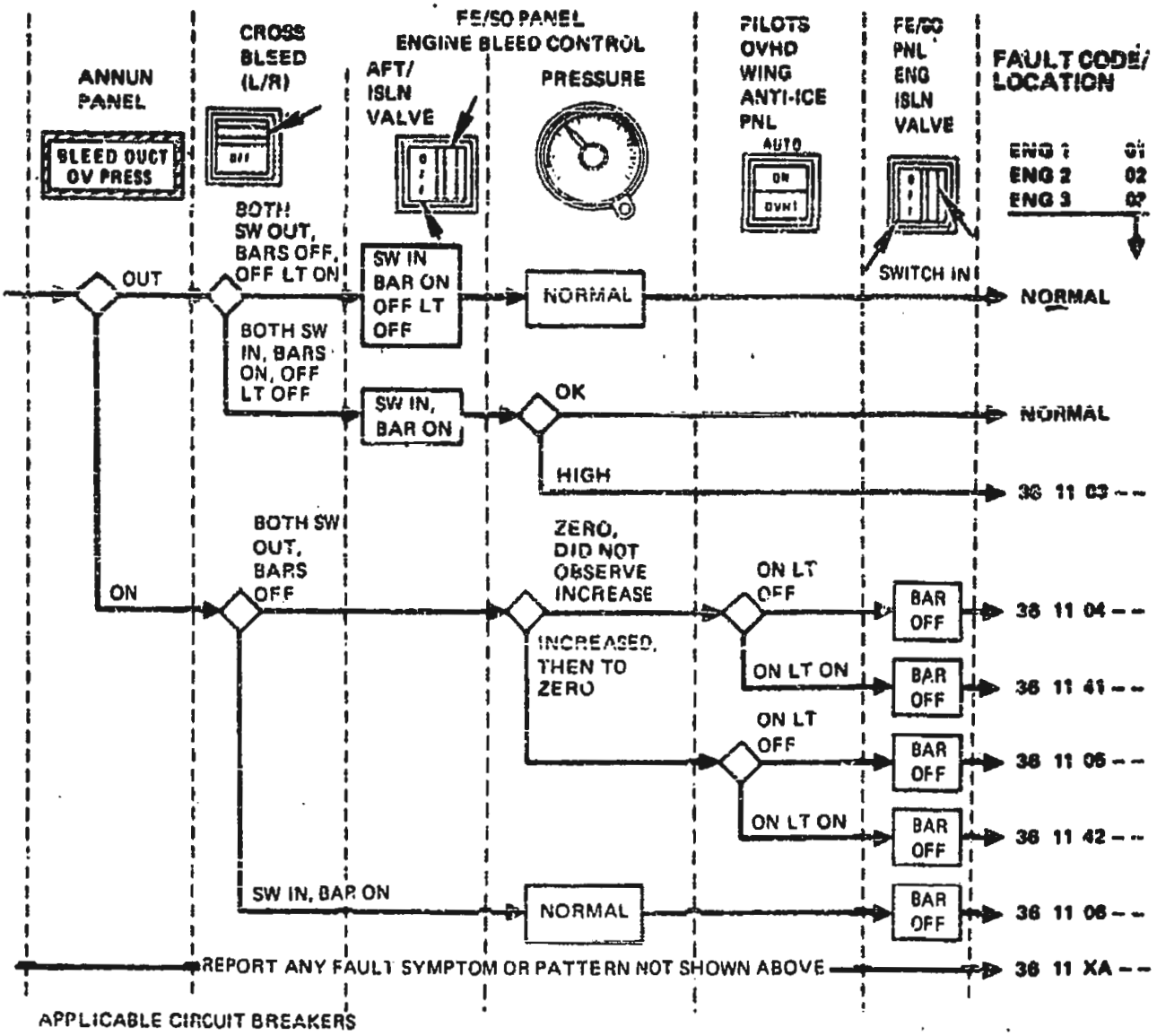
EDI-0008-36-406

AREA OVHT Light, Pack (A, B, or C) - Fault Codes
Figure 1



ED1-0003-36-408

Wing Anti-Ice DUCT FAIL - Fault Codes
Figure 2



APPLICABLE CIRCUIT BREAKERS

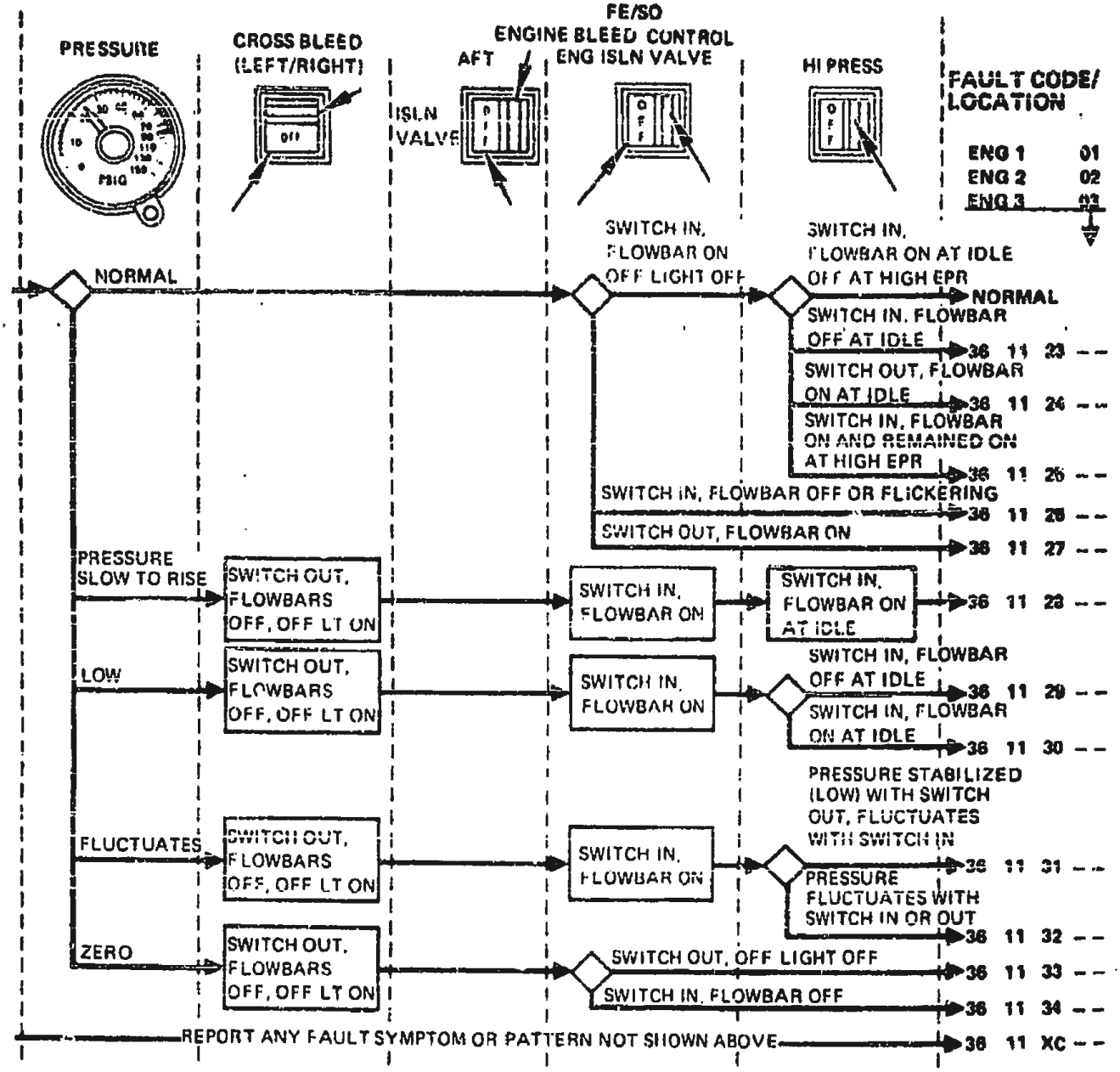
1G10, 11, 12	ENG ISLN VALVES
1G13, 14, 15	HI PRESS VALVES
1G16	FUS ISLN VALVE
1G17, 18	CROSSBLEED VALVES
3R17	BLEED AIR IND

EDI-0003-36-417

R Engine Bleed Air - Fault Codes
Figure 3

EFFECTIVITY: ALL

36-FAULT CODE DIAGRAM

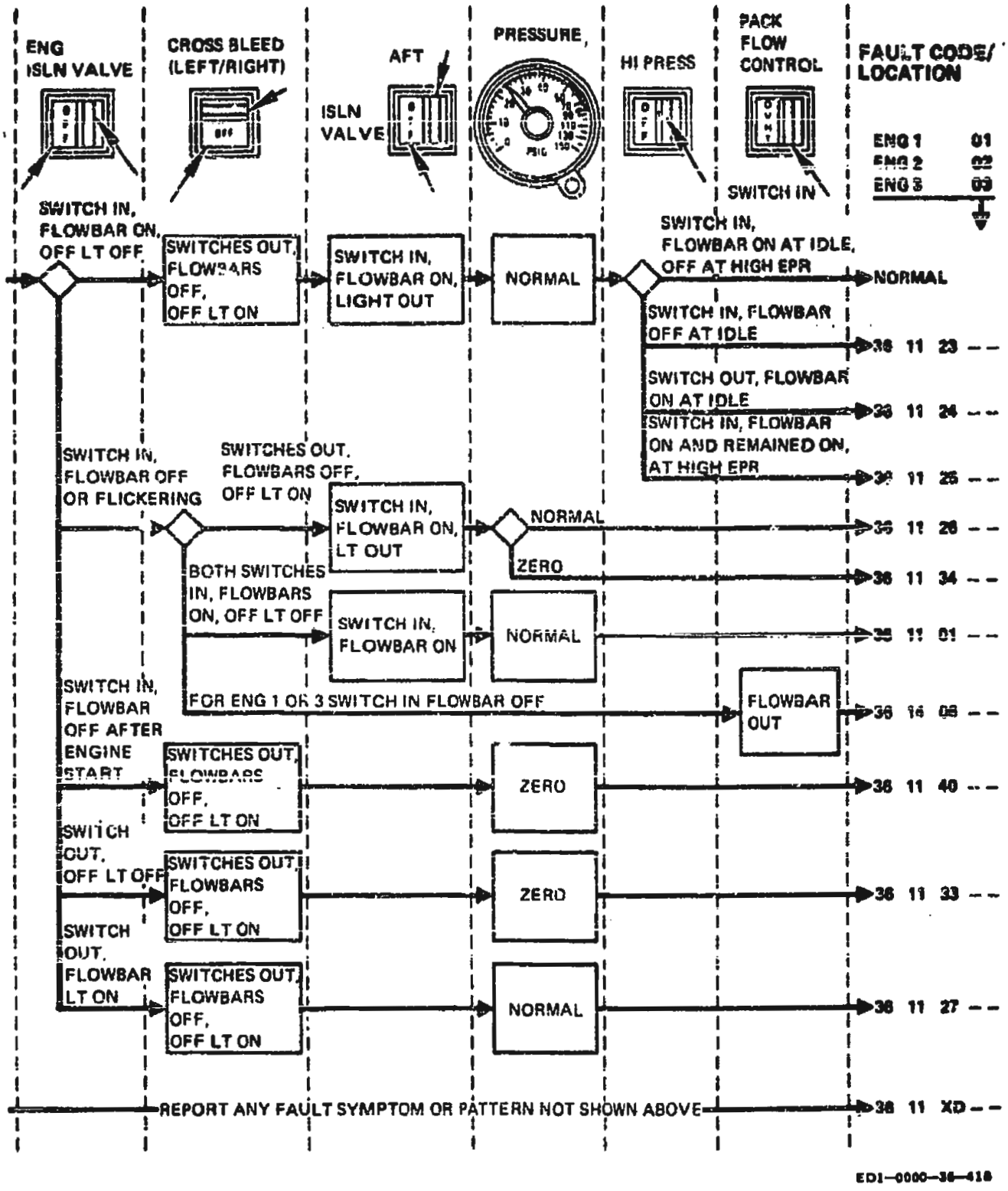

PRESSURE
CROSS BLEED (LEFT/RIGHT)
ISLN VALVE
FE/SO ENGINE BLEED CONTROL
AFT
ENG ISLN VALVE
HI PRESS
FAULT CODE/ LOCATION
ENG 1 01
ENG 2 02
ENG 3 03
NORMAL
SWITCH IN, FLOWBAR ON OFF LIGHT OFF
SWITCH IN, FLOWBAR ON AT IDLE OFF AT HIGH EPR
NORMAL
SWITCH IN, FLOWBAR OFF AT IDLE
36 11 23
SWITCH OUT, FLOWBAR ON AT IDLE
36 11 24
SWITCH IN, FLOWBAR ON AND REMAINED ON AT HIGH EPR
36 11 25
SWITCH IN, FLOWBAR OFF OR FLICKERING
36 11 26
SWITCH OUT, FLOWBAR ON
36 11 27
PRESSURE SLOW TO RISE
SWITCH OUT, FLOWBARS OFF, OFF LT ON
SWITCH IN, FLOWBAR ON
SWITCH IN, FLOWBAR ON AT IDLE
36 11 28
LOW
SWITCH OUT, FLOWBARS OFF, OFF LT ON
SWITCH IN, FLOWBAR ON
SWITCH IN, FLOWBAR OFF AT IDLE
36 11 29
SWITCH IN, FLOWBAR ON AT IDLE
36 11 30
FLUCTUATES
SWITCH OUT, FLOWBARS OFF, OFF LT ON
SWITCH IN, FLOWBAR ON
PRESSURE STABILIZED (LOW) WITH SWITCH OUT, FLUCTUATES WITH SWITCH IN
36 11 31
PRESSURE FLUCTUATES WITH SWITCH IN OR OUT
36 11 32
ZERO
SWITCH OUT, FLOWBARS OFF, OFF LT ON
SWITCH OUT, OFF LIGHT OFF
36 11 33
SWITCH IN, FLOWBAR OFF
36 11 34
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE
36 11 XC

APPLICABLE CIRCUIT BREAKERS

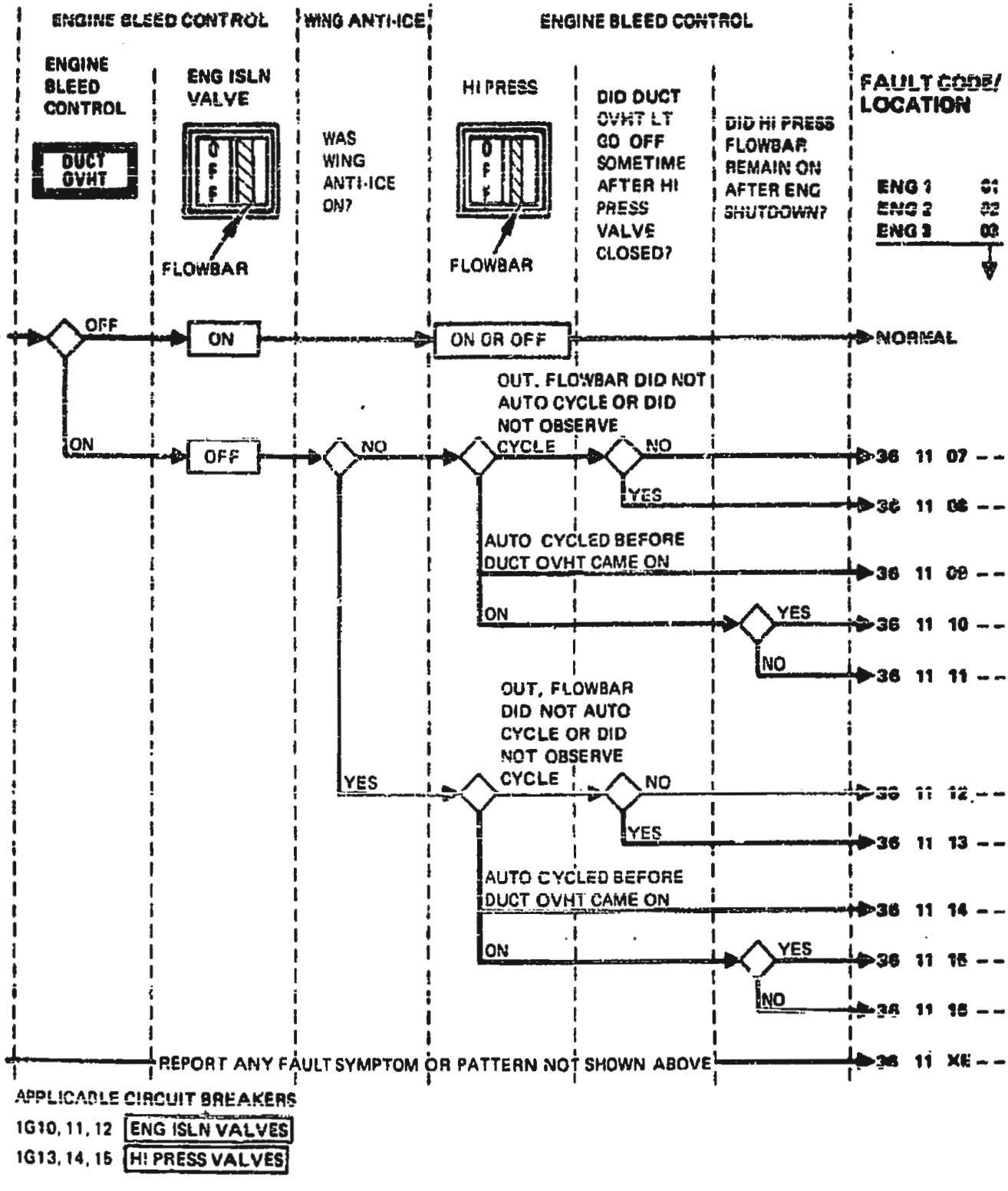
3R17	BLEED AIR IND
1G10, 11, 12	ENG ISLN VALVES
1G13, 14, 15	HIPRESS VALVES
1G16	FUS ISLN VALVE
1G17, 18	CROSSBLEED VALVES

FD1-0005-36-412

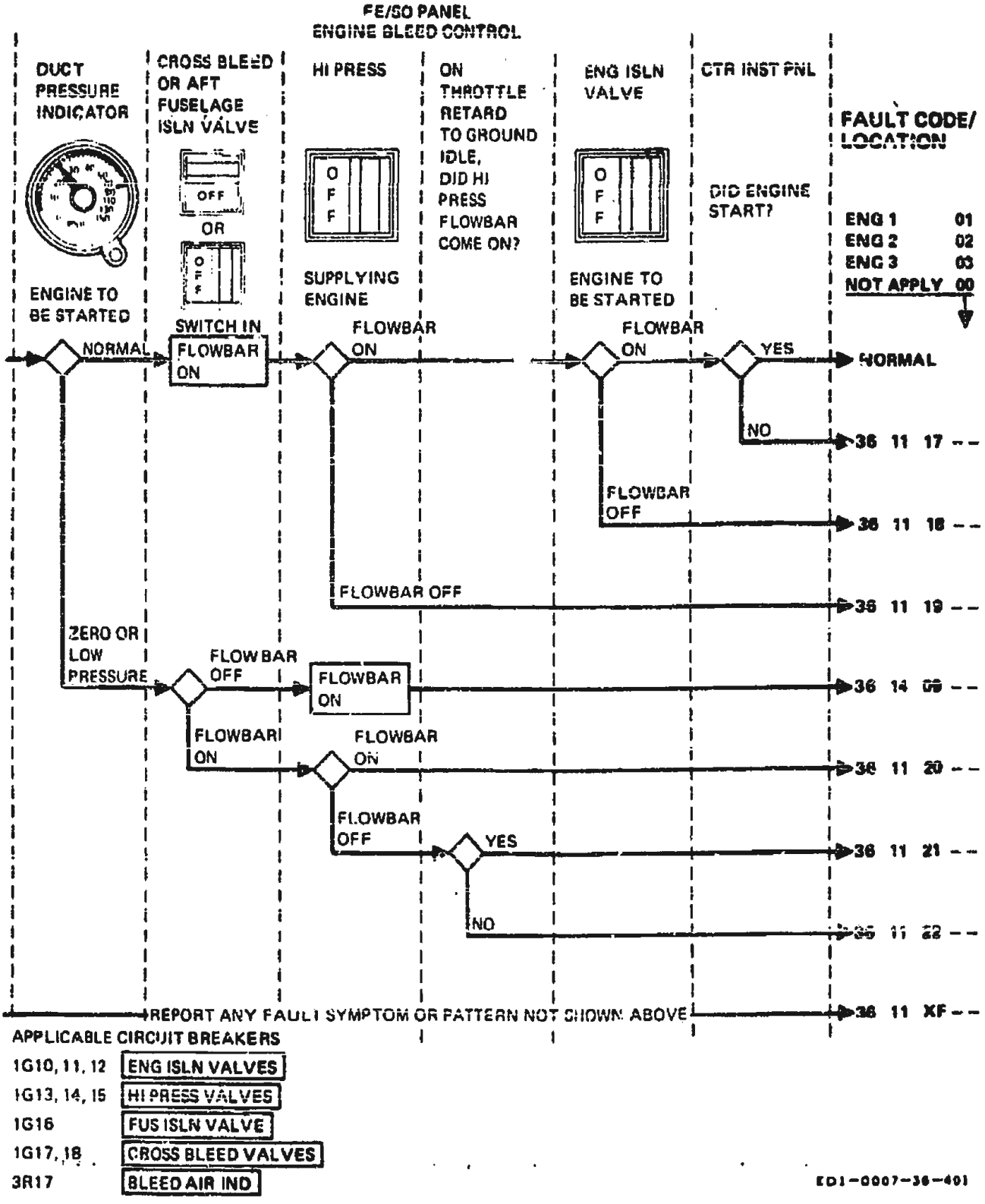
Engine Bleed Air Pressure - Fault Codes
Figure 4


ENG ISLN VALVE
CROSS BLEED (LEFT/RIGHT)
AFT ISLN VALVE
PRESSURE
HI PRESS
PACK FLOW CONTROL
FAULT CODE/ LOCATION
ENG 1 01
ENG 2 02
ENG 3 03
SWITCH IN
SWITCH IN, FLOWBAR ON, OFF LT OFF
SWITCHES OUT, FLOWBARS OFF, OFF LT ON
SWITCH IN, FLOWBAR ON, LIGHT OUT
NORMAL
SWITCH IN, FLOWBAR ON AT IDLE, OFF AT HIGH EPR
NORMAL
SWITCH IN, FLOWBAR OFF AT IDLE
36 11 23
SWITCH OUT, FLOWBAR ON AT IDLE
36 11 24
SWITCH IN, FLOWBAR ON AND REMAINED ON, AT HIGH EPR
36 11 25
SWITCH IN, FLOWBAR OFF OR FLICKERING
SWITCHES OUT, FLOWBARS OFF, OFF LT ON
SWITCH IN, FLOWBAR ON, LT OUT
NORMAL
36 11 26
ZERO
36 11 34
BOTH SWITCHES IN, FLOWBARS ON, OFF LT OFF
SWITCH IN, FLOWBAR ON
NORMAL
36 11 01
SWITCH IN, FLOWBAR OFF AFTER ENGINE START
FOR ENG 1 OR 3 SWITCH IN FLOWBAR OFF
FLOWBAR OUT
36 14 08
SWITCHES OUT, FLOWBARS OFF, OFF LT ON
ZERO
36 11 40
SWITCH OUT, OFF LT OFF
SWITCHES OUT, FLOWBARS OFF, OFF LT ON
ZERO
36 11 33
SWITCH OUT, FLOWBAR LT ON
SWITCHES OUT, FLOWBARS OFF, OFF LT ON
NORMAL
36 11 27
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE
36 11 XD
ED1-0000-36-418

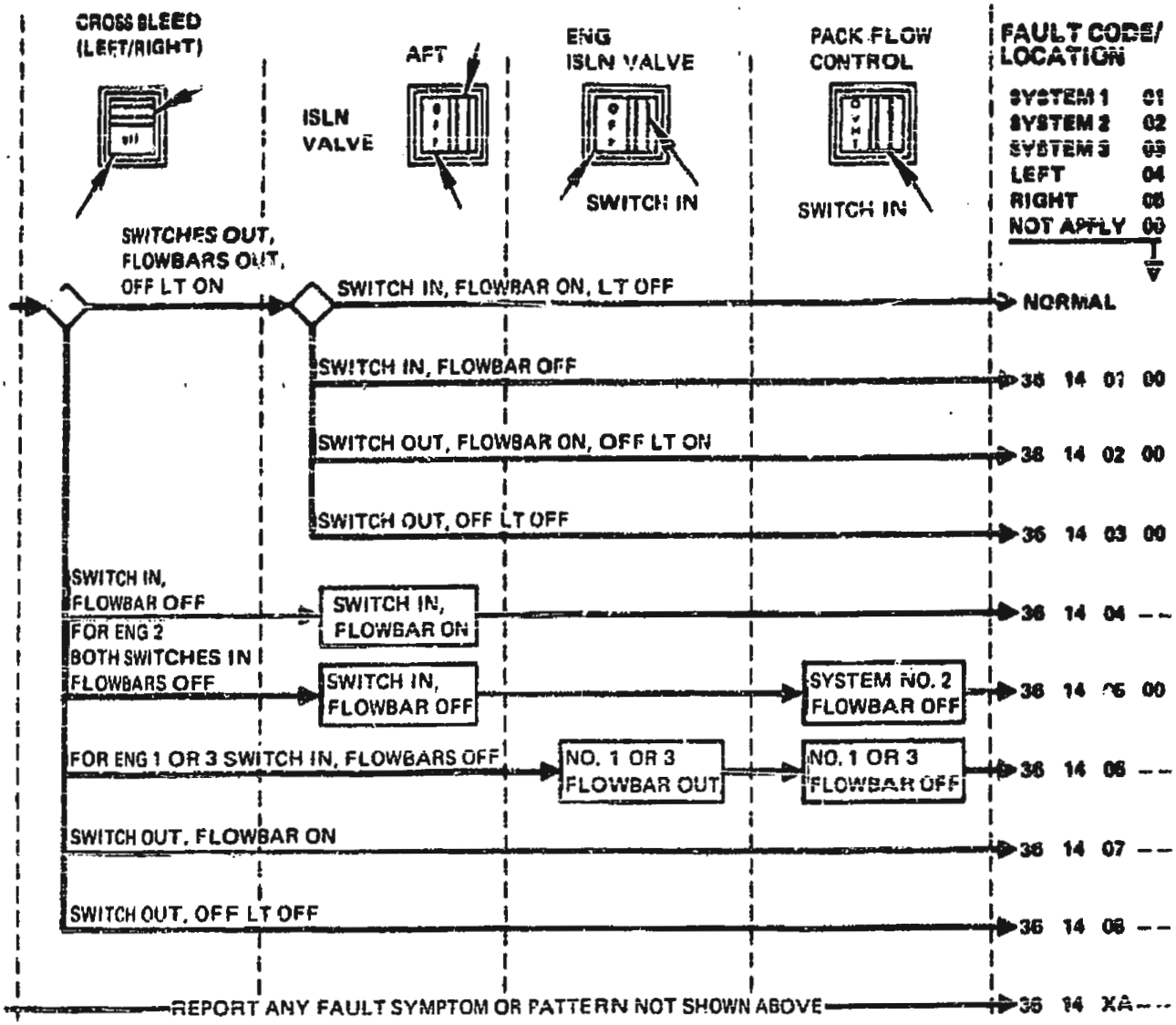
Engine Isolation Valve - Fault Codes
Figure 5



Engine (1, 2, or 3) DUCT OVHT Light - Fault Codes
Figure 6



Crossbleed Start - Fault Codes
Figure 7

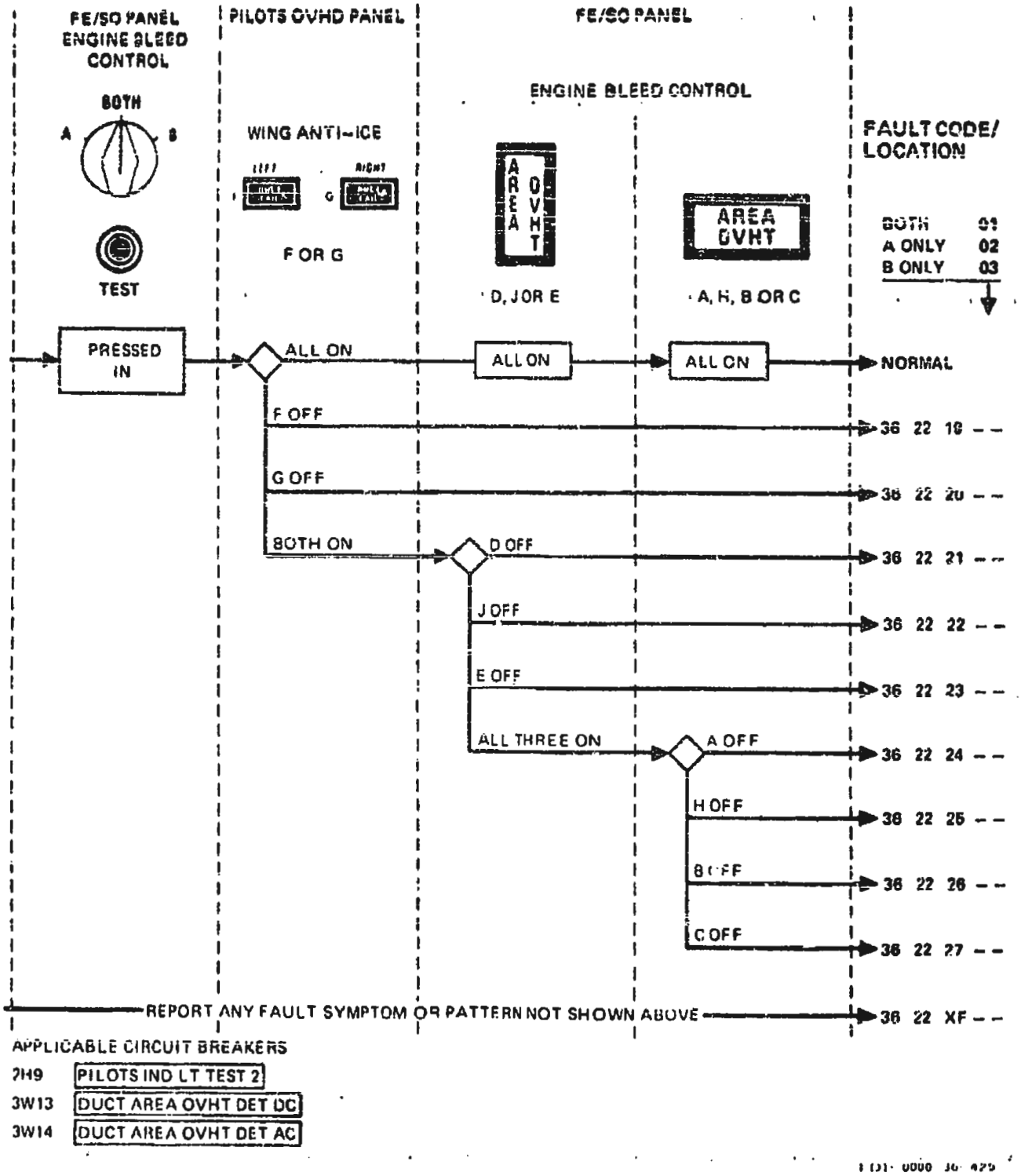

CROSS BLEED (LEFT/RIGHT)
ISLN VALVE
AFT
ENG ISLN VALVE
SWITCH IN
PACK FLOW CONTROL
SWITCH IN
FAULT CODE/ LOCATION
SYSTEM 1 01
SYSTEM 2 02
SYSTEM 3 03
LEFT 04
RIGHT 05
NOT APPLY 00
SWITCHES OUT, FLOWBARS OUT, OFF LT ON
SWITCH IN, FLOWBAR ON, LT OFF
NORMAL
SWITCH IN, FLOWBAR OFF
36 14 01 00
SWITCH OUT, FLOWBAR ON, OFF LT ON
36 14 02 00
SWITCH OUT, OFF LT OFF
36 14 03 00
SWITCH IN, FLOWBAR OFF
SWITCH IN, FLOWBAR ON
36 14 04 --
FOR ENG 2 BOTH SWITCHES IN FLOWBARS OFF
SWITCH IN, FLOWBAR OFF
SYSTEM NO. 2 FLOWBAR OFF
36 14 05 00
FOR ENG 1 OR 3 SWITCH IN, FLOWBARS OFF
NO. 1 OR 3 FLOWBAR OUT
NO. 1 OR 3 FLOWBAR OFF
36 14 06 --
SWITCH OUT, FLOWBAR ON
36 14 07 --
SWITCH OUT, OFF LT OFF
36 14 08 --
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE
36 14 XA --

APPLICABLE CIRCUIT BREAKERS

3R17	BLEED AIR IND	1G16	FUS ISLN VALVE	1G13, 14, 15	HI PRESS VALVES
1G10, 11, 12	ENG ISLN VALVES	1G17, 18	CROSSBLEED VALVES		

ED1-0007-36-811

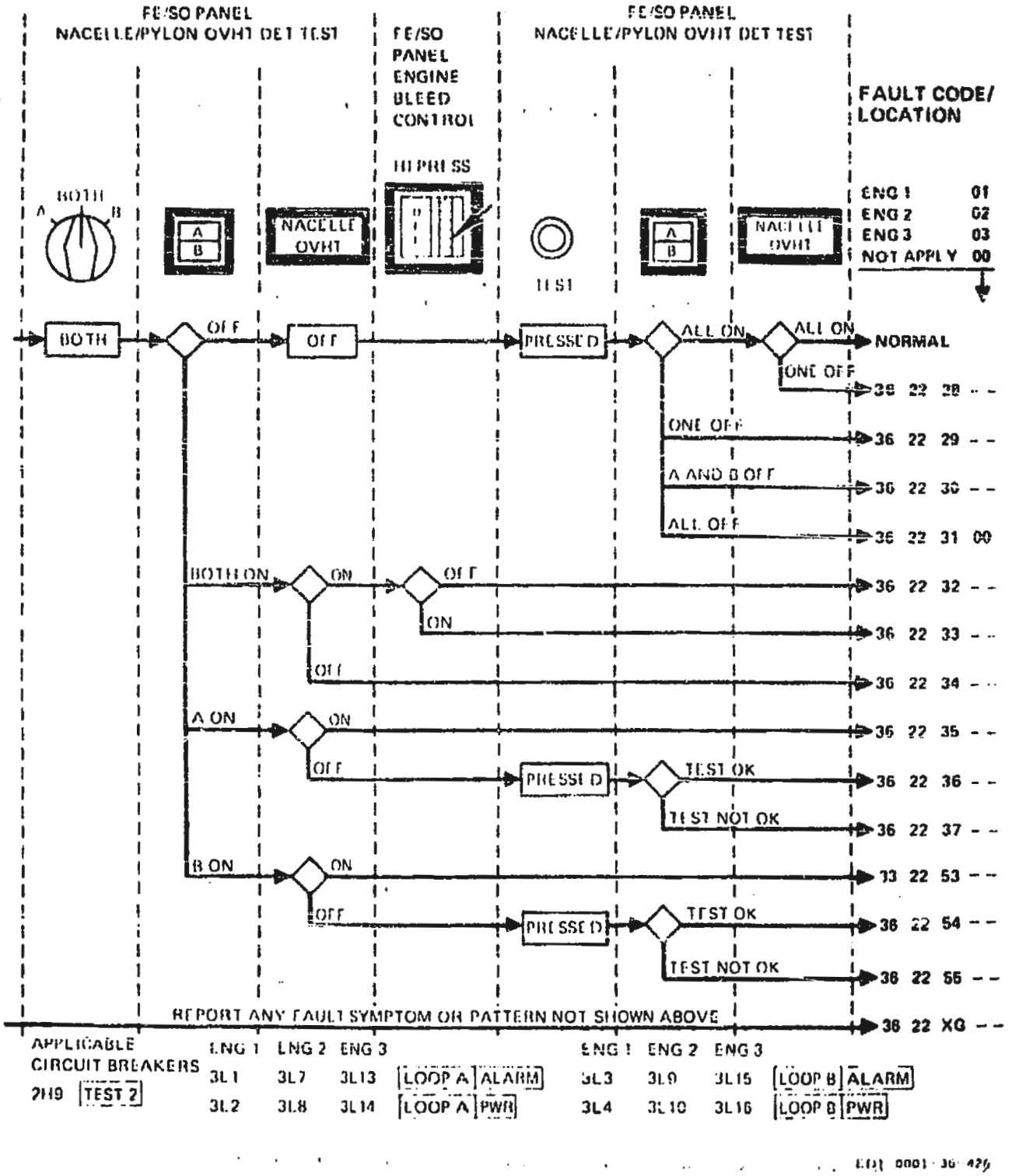
Crossbleed Valve or Aft Isln Valve - Fault Codes
Figure 8



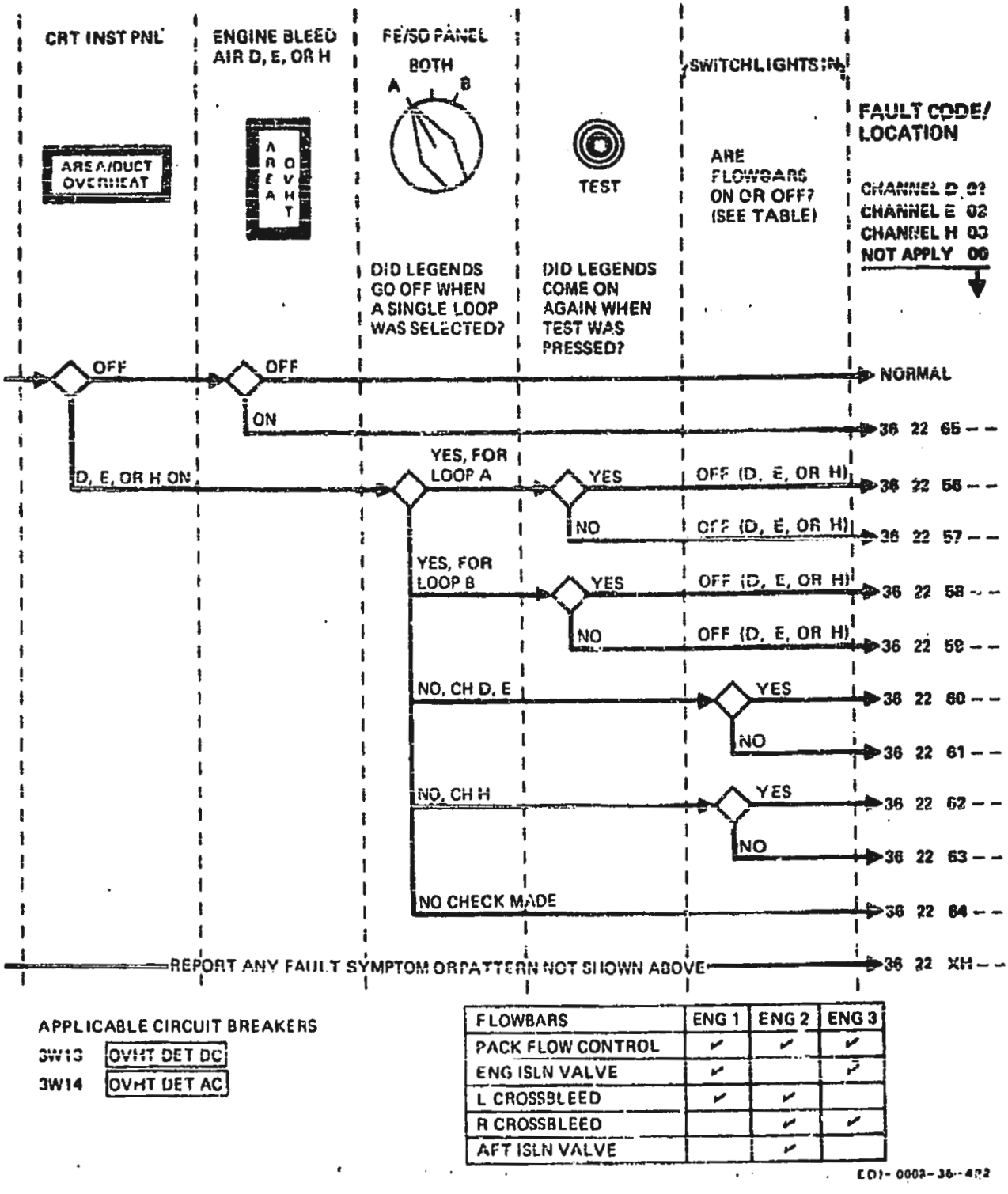
R AREA OVHT TEST - Fault Codes
Figure 9

EFFECTIVITY: ALL

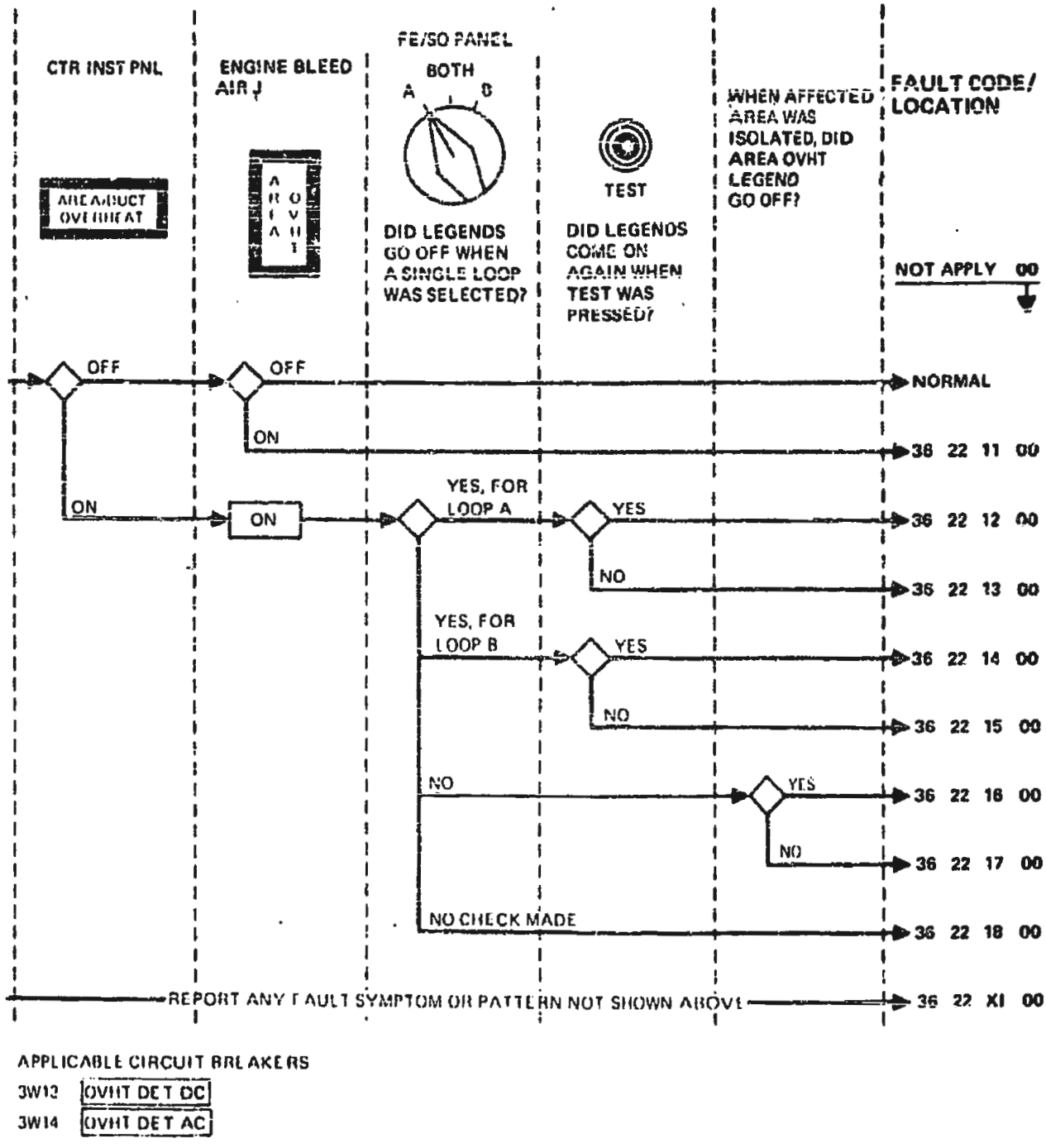
050B



R Nacelle Pylon Overheat Detection - Fault Codes
Figure 10



R AREA OVHT Bleed Air (D, E, or H) Legend - Fault Codes
Figure 11



APPLICABLE CIRCUIT BREAKERS

3W12	OVHT DET DC
3W14	OVHT DET AC

FD1-0001-36-424

R AREA OVHT Bleed Air (Ch J) - Fault Codes
Figure 12

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 XA __	1. An Engine Bleed Air fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-11-00 Fig. 106 Block 1 36-11-00 Fig. 113 Block 1
36 11 XC __	1. An Engine Bleed Air Pressure fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-11-00 Fig. 112 Block 1
36 11 XD __	1. An Engine Isolation Valve fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R R	2. 36-11-00 Fig. 105, 106, 107, 108, 110, 111, 112 Block 1
36 11 XE __	1. An Engine (1, 2, or 3) DUCT OVHT Light fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-11-00 Fig. 104 Block 1
36 11 XF __	1. A Crossbleed Start fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-11-00 Fig. 106, 108 Block 1 36-14-00 Fig. 103 (Sheet 2) Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 14 XA __	1. A Crossbleed Valve or Aft Isln Valve fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R R	2. 36-14-00 Fig. 103 (Sheet 1), 104 (Sheet 1) Block 1
36 22 XA __	1. A Wing Anti-Ice DUCT FAIL fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-22-00 Fig. 104, 107, 111 Block 1
36 22 XE __	1. An AREA OVHT Light, Pack (A, B, or C) fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-22-00 Fig. 103, 107 Block 1.
36 22 XF __	1. An AREA OVHT TEST fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-22-00 Fig. 106 Block 1
36 22 XG __	1. A Nacelle Pylon Overheat Detection fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 36-22-00 Fig. 108, 109 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 XH __	1. An AREA OVHT Bleed Air (D, E, or H) Legend fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 36-22-00 Fig. 104 Block 1
36 22 XI 00	1. An AREA OVHT Bleed Air (Ch J) fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 36-22-00 Fig. 105 Block 1
36 11 01 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) ISLN VALVE switch in and flowbar off. Cross bleed valves and aft isolation valve open. 2. 36-11-00 Fig. 106 Block 2
36 11 02 00	1. NOT USED.
36 11 03 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) bleed duct pressure gage high but FE/SO BLEED DUCT OVERPRESS annunciator off. Crossbleed valves and aft isolation valve open. 2. 36-11-00 Fig. 112 Block 8
36 11 04 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) FE/SO BLEED DUCT OVERPRESSURE light on. WING ANTI-ICE not selected. ENG ISLN VALVE flowbar off. Both crossbleed valves closed. 2. 36-11-00 Fig. 105 Block 2
36 11 05 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) FE/SO BLEED DUCT OVERPRESSURE light on. WING ANTI-ICE not selected. ENG ISLN VALVE switch in, flowbar off. Bleed duct pressure increased then went to zero. Crossbleed valves selected closed. 2. 36-11-00 Fig. 105 Block 4

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 06 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) FE/SO BLEED DUCT OVERPRESSURE light on. ENG ISLN VALVE flowbar off. Bleed duct pressure normal with crossbleed valves open.
	2. 36-11-00 Fig. 105 Block 2
36 11 07 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT and AREA/DUCT OVHT lights on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar did not cycle or not observe to cycle. DUCT OVHT light did not go off sometime after HP valve closed.
	2. 36-11-00 Fig. 106 Block 9
36 11 08 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar did not cycle or not observe to cycle. DUCT OVHT light went off sometime after HP valve closed. Wing anti-ice off.
	2. 36-11-00 Fig. 104 Block 4
36 11 09 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT and AREA/DUCT OVHT lights on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar cycled before DUCT OVHT came on.
	2. 36-11-00 Fig. 104 Block 4
36 11 10 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT and AREA/DUCT OVHT lights on, ENG ISLN VALVE flowbar off. HI PRESS flowbar on. Flowbar remained on after engine shutdown.
	2. 36-11-00 Fig. 104 Block 6

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 11 __	1. (01=Eng 1 02=Eng 2, 03=Eng 3) DUCT OVHT and AREA/DUCT OVHT lights on, ENG ISLN VALVE flowbar off. HI PRESS flowbar on. Flowbar went off after engine shutdown.
	2. 36-11-00 Fig. 104 Block 4
36 11 12 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar did not auto cycle or not observe to cycle. DUCT OVHT light did not go off sometime after HP valve closed. Wing anti-ice on.
	2. 36-11-00 Fig. 104 Block 9
36 11 13 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar did not auto cycle or not observe to cycle. DUCT OVHT light went off sometime after HP valve closed. Wing anti-ice on.
	2. 36-11-00 Fig. 104 Block 4
36 11 14 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE and HI PRESS flowbars off. HI PRESS flowbar auto cycled before DUCT OVHT came on. Wing anti-ice on.
	2. 36-11-00 Fig. 104 Block 4
36 11 15 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE flowbar off. HI PRESS flowbar on. Flowbar remained on after engine shutdown. Wing anti-ice on.
	2. 36-11-00 Fig. 104 Block 6

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 16 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) DUCT OVHT light on, ENG ISLN VALVE flowbar off. HI PRESS flowbar on. Flowbar went off after engine shutdown. Wing anti-ice on.
	2. 36-11-00 Fig. 104 Block 4
36 11 17 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Duct PRESS normal, CROSSBLEED or Aft Fuselage ISLN valve flowbar on, HI PRESS Flowbar on, Engine ISLN Valve Flowbar on. Engine did not start.
	2. 36-11-00 Fig. 106 Block 2
36 11 18 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Isolation valve flowbar off for starting engine during engine start.
	2. 36-11-00 Fig. 106 Block 1
36 11 19 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Supplying engine, HI PRESS flowbar off, bleed pressure normal.
	2. 36-11-00 Fig. 108 Block 1
36 11 20 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low or zero during start of engine. Crossbleeds and supplying engine HI PRESS flowbars on. Supplying engine pressure increased gradually when advancing throttle from ground idle.
	2. 36-11-00 Fig. 112 Block 4
36 11 21 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low or zero during start of engine. Crossbleed flowbars on and supplying engine HI PRESS flowbar off. HI PRESS flowbar off. On throttle retard to ground idle, HI PRESS flowbar on.
	2. 36-11-00 Fig. 112 Block 4

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 22 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low or zero during start of engine. Crossbleed flowbars on and supplying engine HI PRESS flowbar off. On throttle retard to ground idle, HI PRESS flowbar stays off. 2. 36-11-00 Fig. 108 Block 1
36 11 23 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) HI PRESS switch in, flowbar off at idle. Bleed press normal and both crossbleed valves closed. 2. 36-11-00 Fig. 108 (Sheet 1) Block 6
36 11 24 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) HI PRESS switch out, flowbar on at idle. Bleed pressure normal and both crossbleed valves closed. 2. 36-11-00 Fig. 109 Block 1
36 11 25 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) HI PRESS switch in, flowbar on and remained on at high EPR bleed duct pressure normal and both crossbleed valves closed. 2. 36-11-00 Fig. 113 Block 1
36 11 26 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) ENG ISLN VALVE switch in, flowbar off or flickering. Engine Bleed pressure normal. Both crossbleed valves closed. 2. 36-11-00 Fig. 106 Block 8
36 11 27 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) ISLN VALVE switch out, flowbar on. Bleed pressure normal. Both crossbleed valves closed. 2. 36-11-00 Fig. 107 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 28 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) bleed duct pressure slow to rise with ENG ISLN VALVE and HI PRESS switches in, flowbars on.
	2. 36-11-00 Fig. 112 Block 4
36 11 29 __	1. 01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low, ENG ISLN VALVE switch in, flowbar on. HI PRESS switch in, flowbar off. Both crossbleed valves closed.
	2. 36-11-00 Fig. 108 (Sheet 1) Block 3
36 11 30 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low, ENG ISLN VALVE switch in flowbar on. HI PRESS switch in, flowbar on. Both crossbleed valves closed.
	2. 36-11-00 Fig. 112 Block 4
36 11 31 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed pressure fluctuates. ENG ISLN VALVE switch in, flowbar on. Bleed pressure stabilized low after corresponding HI PRESS valve switch out. Both crossbleed valves closed.
	2. 36-11-00 Fig. 112 Block 4
36 11 32 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) bleed pressure fluctuates, ENG ISLN VALVE switch in, flowbar on. Bleed pressure fluctuating with HI PRESS switch in or out. Both crossbleed valves closed.
	2. 36-11-00 Fig. 112 Block 7
36 11 33 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Engine bleed duct pressure zero. ENG ISLN VALVE switch out and OFF light off. Both cross bleed valves closed. FE/SO BLEED DUCT OVERPRESSURE annunciator light off.
	2. 36-11-00 Fig. 110 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 34 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure zero. ENG ISLN VALVE switch in and flowbar off. Both crossbleed valves closed.
	2. 36-11-00 Fig. 110 Block 1
36 11 35 00	1. NOT USED.
36 11 36 00	1. NOT USED.
36 11 37 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) ENG ISLN VALVE flowbar off. Bleed duct pressure satisfactory, starter VALVE OPEN light on. Engine start satisfactory.
	2. 36-11-00 Fig. 106 Block 8
36 11 38 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) ENG ISLN VALVE flowbar off. Bleed duct pressure satisfactory, starter VALVE OPEN light off out, no N3 indication.
	2. 36-11-00 Fig. 106 Block 8
36 11 39 00	1. NOT USED.
36 11 40 __	1. (01=ENG 1, 02=ENG 2, 03=ENG 3) ISLN VALVE switch in, flowbar off after engine start. Both crossbleed valve switches out, flowbar off, OFF lt on, pressure zero.
R	2. 36-11-00 Fig. 106 Block 1
36 11 41 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) FE/SO BLEED DUCT OVERPRESSURE light on. WING ANTI-ICE selected. ENG ISLN VALVE flowbar off. Both crossbleed valves closed.
	2. 36-11-00 Fig. 105 Block 2

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 11 42 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) FE/SO BLEED DUCT OVERPRESSURE light on. WING ANTI-ICE selected. ENG ISLN VALVE switch in flowbar off. Bleed duct pressure increased then went to zero. Crossbleed valves closed.
	2. 36-11-00 Fig. 105 Block 4
36 14 01 00	1. Aft ISLN VALVE switch in, flowbar off.
	2. 36-14-00 Fig. 103 (Sheet 1) Block 5
36 14 02 00	1. Aft ISLN VALVE switch out, flowbar on, OFF light on.
	2. 36-14-00 Fig. 103 (Sheet 1) Block 11
36 14 03 00	1. Aft ISLN VALVE switch out, OFF light off.
	2. 36-14-00 Fig. 103 (Sheet 1) Block 8
36 14 04 __	1. (04=Left, 05=Right) CROSSBLEED switch in, flowbar off. Aft ISLN VALVE switch in, flowbar on.
	2. 36-14-00 Fig. 103 (Sheet 1) Block 5
36 14 05 00	1. Flowbars off for following switchlights with switches in; LEFT and RIGHT CROSSBLEED, aft ISLN VALVE, and system No. 2 PACK FLOW CONTROL.
	2. 36-14-00 Fig. 104 (Sheet 1) Block 1
36 14 06 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) flowbars off for following switches with switches in: LEFT and RIGHT CROSSBLEED, ENG ISLN VALVE, and PACK FLOW CONTROL.
	2. 36-14-00 Fig. 104 (Sheet 1) Block 1
R 36 14 07 __ R	1. (04=Left, 05=Right) CROSSBLEED switch out, flowbar on
	2. 36-14-00 Fig. 103 (Sheet 1) Block 7

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 14 08 __	1. (04=Left, 05=Right) CROSSBLEED switch out, OFF light off.
	2. 36-14-00 Fig. 104 (Sheet 1) Block 13
36 14 09 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Bleed duct pressure low or zero during start of engine. L/H or R/H crossbleed flowbar off, switch in. Aft Fuselage Isolation Valve and supplying engine HI PRESS flowbar on.
	2. 36-14-00 Fig. 103 (Sheet 2) Block 1
36 22 01 __	1. (01=Left, 02=Right) Wing anti-ice DUCT FAIL light on. Light off after wing anti-ice regulating shutoff valve closed. Pilots AREA/DUCT OVERHEAT light off.
	2. 36-22-00 Fig. 104 Block 1 36-22-00 Fig. 107 Block 1 for Pilots AREA/DUCT OVERHEAT light problem.
36 22 02 __	1. (01=Left, 02=Right) Wing anti-ice DUCT FAIL light on. Light off after ENG ISLN VALVE and crossbleed valves closed. Pilots AREA/DUCT OVERHEAT light off.
	2. 36-22-00 Fig. 104 Block 7 DUCT FAIL light 36-22-00 Fig. 107 Block 1
36 22 03 __	1. (01=Left, 02=Right) Wing anti-ice DUCT FAIL light on. Light on after engine isolation valve and crossbleed valves closed. Pilots AREA/DUCT OVERHEAT light off.
	2. 36-22-00 Fig. 104 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 04 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT annunciator and wing anti-ice DUCT FAIL light on. Lights off when loop A selected and lights on again when TEST pressed. 2. 36-22-00 Fig. 106 Block 7 for loop B
36 22 05 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT annunciator and wing anti-ice DUCT FAIL light on. Lights off when loop A selected and remained off when TEST pressed. 2. 36-22-00 Fig. 106 Block 7 for loop A
36 22 06 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT annunciator and wing anti-ice DUCT FAIL light on. Lights off when loop B selected and lights on again when TEST pressed. 2. 36-22-00 Fig. 106 Block 7 for loop A
36 22 07 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT annunciator and wing anti-ice DUCT FAIL light on. Lights off when loop B selected and remained off when TEST pressed. 2. 36-22-00 Fig. 106 Block 6 for loop B
36 22 08 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT light and Wing anti-ice DUCT FAIL light on. Light remained on when loops A and B were selected. DUCT FAIL light off after wing anti-ice regulating shutoff valve closed. 2. 36-22-00 Fault Isolation

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 09 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT light and Wing anti-ice DUCT FAIL light on. Light remained on when loops A and B were selected. DUCT FAIL light off after engine isolation valve and cross bleed valves closed. 2. 36-22-00 Fig. 104 Block 5 30-13-00 Fault Isolation
36 22 10 __	1. (01=Left, 02=Right) Pilots AREA/DUCT OVERHEAT light and Wing anti-ice DUCT FAIL light on. Light remained on when loops A and B were selected. DUCT FAIL light remained on after engine isolation valve and crossbleed valves closed. 2. 36-22-00 Fig. 106 Block 7
36 22 11 00	1. Channel J Bleed air AREA OVHT legend on. Pilots AREA/DUCT OVERHEAT legend off. 2. 36-22-00 Fig. 107 Block 1
36 22 12 00	1. Channel J Bleed air AREA OVHT legends on. Legends off when loop A selected, and legends on again when TEST pressed. 2. 36-22-00 Fig. 106 Block 7 Fault for loop B
36 22 13 00	1. Channel J Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends off when loop A selected, and remained out when TEST pressed. 2. 36-22-00 Fig. 106 Block 7 Fault for loop A

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 14 00	1. Channel J Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends off when loop B selected, and legends on again when TEST pressed.
	2. 36-22-00 Fig. 106 Block 7 Fault for loop B
36 22 15 00	1. Channel J Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends off when loop B selected, and remained off when TEST pressed.
	2. 36-22-00 Fig. 106 Block 7 for loop B
36 22 16 00	1. Channel J Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends remained on when loops A and B were selected. Legends off after area was isolated.
R	2. 36-22-00 Fig. 105 Block 1 (Chan J)
36 22 17 00	1. Channel J Bled air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends remained on when loops A and B were selected and after area was isolated.
	2. 36-22-00 Fig. 106 Block 7
36 22 18 00	1. Channel J Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAD legends on. No loop isolation test made.
	2. 36-22-00 Fig. 106 Block 7
36 22 19 __	1. (01=Both, 02=Loop A , 03=Loop B) AREA OVHT TEST pressed in, left (F) DUCT FAIL light off.
	2. 36-22-00 Fig. 106 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 20 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, right (G) DUCT FAIL light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 21 __	1. (01=Both Loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (D) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 22 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (J) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 23 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (E) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 24 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (A) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 25 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (H) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 26 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST pressed in, (B) AREA OVHT light off.
	2. 36-22-00 Fig. 106 Block 1
36 22 27 __	1. (01=Both loops, 02=Loop A, 03=Loop B) AREA OVHT TEST PRESSED IN, (C) AREA OVHT light C off.
	2. 36-22-00 Fig. 106 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 28 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) NACELLE OVHT light off during test. All other lights OK.
	2. 36-22-00 Fig. 109 Block 11
36 22 29 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) NACELLE PYLON loop A or B light off when tested. All other lights OK.
	2. 36-22-00 Fig. 109 Block 14
36 22 30 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) NACELLE PYLON loop A and B lights off when tested.
	2. 36-22-00 Fig. 109 Block 13
36 22 31 00	1. All A and B lights off when tested.
	2. 36-22-00 Fig. 109 Block 12
36 22 32 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) A, B, and NACELLE OVHT lights on; HP valve flowbar off.
	2. 36-22-00 Fig. 108 Block 4
36 22 33 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) A, B, and NACELLE OVHT lights on; HP valve flowbar on.
	2. 36-22-00 Fig. 110 Block 1
36 22 34 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) A, B lights on; NACELLE OVHT light off.
	2. 36-22-00 Fig. 108 Block 7
36 22 35 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) NACELLE OVHT and loop A light on; loop B light off.
	2. 36-22-00 Fig. 108 Block 8

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 36 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) loop A light on; NACELLE OVHT light off. Loop B test OK.
	2. 36-22-00 Fig. 108 Block 9
36 22 37 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) loop A light on; NACELLE OVHT light off. Loop B did not test OK.
	2. 36-22-00 Fig. 108 Block 10
36 22 38 00	1. Pilots AREA/DUCT OVERHEAT light off Area A, B and C AREA OVHT on.
	2. 36-22-00 Fig. 107 Block 1
36 22 39 __	1. Pilots AREA/DUCT OVERHEAT light on. (01=Area A, 02=Area B, 03=Area C) AREA OVHT on, lights off when single loop selected but came on when TEST pressed.
	2. 36-22-00 Fig. 103 Block 5
36 22 40 __	1. Pilots AREA/DUCT OVERHEAT light on. (01=Area A, 02=Area B, 03=Area C) AREA OVHT on, lights off when single loops selected and stays off when TEST pressed. AREA OVHT off after closing associated PACK FLOW CONTROL valve.
R	2. 36-22-00 Fig. 103 Block 9
36 22 41 __	1. Pilots AREA/DUCT OVERHEAT light on. (01=Area A, 02=Area B, 03=Area C) AREA OVHT on, lights off when single loop selected and stays off when TEST pressed. AREA OVHT on after closing associated PACK FLOW CONTROL valve.
	2. 36-22-00 Fig. 103 Block 5

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 42 __	1. Pilots AREA/DUCT OVERHEAT light on. (01=Area A, 02=Area B, 03=Area C) AREA OVHT on, and stays on when single loop selected. AREA OVHT off after closing associated PACK FLOW CONTROL valve. 2. 36-22-00 Fig. 103 Block 9
36 22 43 __	1. Pilots AREA/DUCT OVERHEAT light on. (01=Area A, 02=Area B, 03=Area C) AREA OVHT on, and stays on when single loop selected. AREA OVHT on after closing associated Pack FLOW CONTROL valve. 2. 36-22-00 Fig. 103 Block 5
36 22 44 00	1. Pilots AREA/DUCT OVERHEAT light on, area A, B and C AREA OVHT on. FWD CARGO HEAT HOT light on. 2. 36-22-00 Fig. 103 Block 6
36 22 45 00	1. Pilots AREA/DUCT OVERHEAT light on. Area A, B, and C AREA OVHT on. FWD CARGO HEAT HOT light off. 2. 36-22-00 Fig. 103 Block 7
36 22 46 00	1. NOT USED.
36 22 47 00	1. NOT USED.
36 22 48 00	1. NOT USED.
36 22 49 00	1. NOT USED.
36 22 50 00	1. NOT USED.
36 22 51 00	1. NOT USED.
36 22 52 00	1. NOT USED.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 53 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) NACELLE OVHT and loop B light on; loop A light off.
	2. 36-22-00 Fig. 108 Block 8
36 22 54 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) loop B light on; NACELLE OVHT light off. Loop A test OK.
	2. 36-22-00 Fig. 108 Block 9
36 22 55 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) loop B light on; NACELLE OVHT light off. Loop A did not test OK.
	2. 36-22-00 Fig. 108 Block 10
36 22 56 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA/DUCT OVERHEAT legends on. (For channel D or E: pack flow, engine isolation, and L/R crossbleed valve flowbars off). (For channel H: pack flow, aft isolation, and L and R crossbleed valve flowbars off.) Legends off when loop A selected, and legends on again when TEST pressed (flowbars remain off).
R	2. 36 22 00 Fig. 106 Block 7 Fault for loop B
36 22 57 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and pilots AREA/DUCT OVERHEAT legends on. (For channel D or E: pack flow, engine isolation, and L/R crossbleed valve flowbars off). (For channel H: pack flow, aft isolation, and L and R crossbleed valve flowbars off.) Legends off when loop A selected, and remained out when TEST pressed.
	2. 36-22-00 Fig. 106 Block 7 Fault for loop A

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 58 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and pilots AREA/DUCT OVERHEAT legends on. (For channel D or E: pack flow, engine isolation, and L/R crossbleed valve flowbars off). (For channel H: pack flow, aft isolation, and L and R crossbleed valve flowbars off.) Legends off when loop B selected, and legends on again when TEST pressed (flowbars remain off). 2. 36-22-00 Fig. 106 Block 7 for loop B
36 22 59 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends off when loop B selected, and remained off when TEST pressed. (For channel D or E: pack flow, engine isolation, and L/R crossbleed valve flowbars off). (For channel H pack flow, aft isolation and L and R crossbleed valve flowbars off.) 2. 36-22-00 Fig. 106 Block 7 for loop B
36 22 60 __	1. Channel (01=D, 02=E) Bleed air AREA OVHT and Pilots AREA/DUCT legends on. (For channel D or E: pack, flow, engine isolation, and L/R crossbleed valve flowbars off). Legends remained on when loops A and B were selected. Legends off after area was isolated. 2. 36-22-00 Fig. 104 Block 1 (Chan D or E)
36 22 61 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legends remained on when loops A and B were selected and after area was isolated. (For channel D or E: pack flow, engine isolation, and L/R crossbleed valve flowbars on). 2. 36-22-00 Fig. 106 Block 7

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
36 22 62 __	1. Channel (03=H) Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. Legend remained on when loops A and B were selected and after area was isolated. (For channel H pack flow, engine isolation, and L/R crossbleed valve flowbars off). 2. 36-22-00 Fig. 106 Block 7
36 22 63 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on. (For channel H: pack flow, aft isolation, and L and R crossbleed valve flowbars on.) Legends remained on when loops A and B were selected. Legends off after area was isolated. 2. 36-22-00 Fig. 104 Block 1
36 22 64 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT and Pilots AREA/DUCT OVERHEAT legends on, no loop isolated test made. 2. 36-22-00 Fig. 106 Block 7
36 22 65 __	1. Channel (01=D, 02=E, 03=H) Bleed air AREA OVHT legend on. Pilots AREA/DUCT OVERHEAT legend off. 2. 36-22-00 Fig. 107 Block 1

R PNEUMATIC SYSTEM - DESCRIPTION AND OPERATION

1. General

The pneumatic system consists of the following:

Distribution	36-10-00
Engine Bleed Air	36-11-00
APU Load Compressor Air	36-12-00
High-pressure Ground Air	36-13-00
Distribution Manifold	36-14-00
Indicating	36-20-00
Bleed Air Pressure Indicating	36-21-00
Bleed Air Overheat Warning	36-22-00

Figure 1 shows the pneumatic pressure sources, the pneumatic distribution system, the air conditioning system (Ref. 21-00-00), and connections to other systems that use pneumatic pressure. Sheets 1 and 2 show the pneumatic sources. Sheets 3, 4 and 5 are on overall view from the pneumatic pressure source to the using systems.

Systems using air from the pneumatic system are:

Air Conditioning, Chapter 21

Wing and Engine Inlet Anti-ice, Chapter 30

Engine Thrust Reverser, Chapter 78

Engine Starter, Chapter 80

ATMS, Hydraulic Power, Chapter 29

Figure 2 shows controls and indicators for systems providing and distributing pneumatic pressure, and for the air conditioning system. The controls and indicators for the pneumatic system are in the ENGINE BLEED CONTROL section (upper left) of the Flight Engineer/Second Officers upper panel, zone 215. Air conditioning system controls and indicators are on the lower left and center sections of the same panel. The APU CONTROL panel is located in the Flight Engineer/Second Officers lower panel.

The distribution system consists of systems used to obtain and to distribute compressed air to the using systems.

The engine bleed air system (Ref. 36-11-00) takes intermediate- and high-pressure bleed air from each engine, controls its

pressure and temperature, and delivers it to the distribution manifold.

The APU load compressor air system (Ref. 36-12-00) connects compressor discharge air to the crossbleed manifold. The APU engine-driven load compressor, as part of the APU, is covered in Chapter 49.

The high-pressure ground air system (Ref. 36-13-00) connects high-pressure ground air sources directly to the crossbleed manifold.

The distribution manifold system (Ref. 36-14-00) receives compressed air from the above sources, controls its routing, and delivers it to the using systems. Crossbleed and isolation valves in the distribution manifold system are located to minimize the effect of supply or using system malfunction (Ref. Fig. 3 and 4).

The indicating system consists of pressure indicating and overheat warning systems.

The bleed air pressure indicating system (Ref. 36-21-00) includes three pressure transmitters (transducers) and indicators. Pressure sensing points are positioned in the distribution manifold system for maximum usefulness. By opening or closing distribution manifold crossbleed or isolation valves, discharge pressures from individual pressure sources or input pressures to using systems can be monitored (Ref. Fig. 2).

The bleed air overheat warning system (Ref. 36-22-00) includes continuous wire temperature sensors, thermal switches, an overheat controller, and caution and warning lights in the flight station.

Temperature sensors are installed near ducting and components carrying high-pressure air, to detect significant hot air leakage. All pneumatic system ducting is monitored, as is the high-pressure ducting in the wing (Ref. 36-11-00), the wing anti-ice system (Ref. 30-13-00) and the air conditioning distribution system (Ref. 21-21-00).

R Thermal switches are installed in all three cargo heat exchangers (Ref. 21-44-00).

The pneumatic system is divided into 12 areas to localize overheat caution and warning indications. Individual caution lights for each area are located on the ENGINE BLEED CONTROL and NACELLE/PYLON OVHT DET TEST panels at the Flight Engineer/Second Officers upper panel zone 215.

The AREA/DUCT OVHT caution light, or a NACELLE OVHT warning light (one for each engine), in the pilots main instrument panel, zone 210, comes on when an area or duct overheat or nacelle overheat condition, respectively, occurs.

Pressure and temperature sensors are also located at selected points in the pneumatic system (Ref. 36-11-00, 36-12-00, 36-14-00, and 36-21-00) for data sampling by the aircraft integrated data system (AIDS)(Ref. 31-32-00).

A 28V dc signal is also applied to the EPR (Engine Pressure Ratio) computer when wing anti-ice is selected (Ref. 30-13-00).

2. Description

A. OVHT Indication

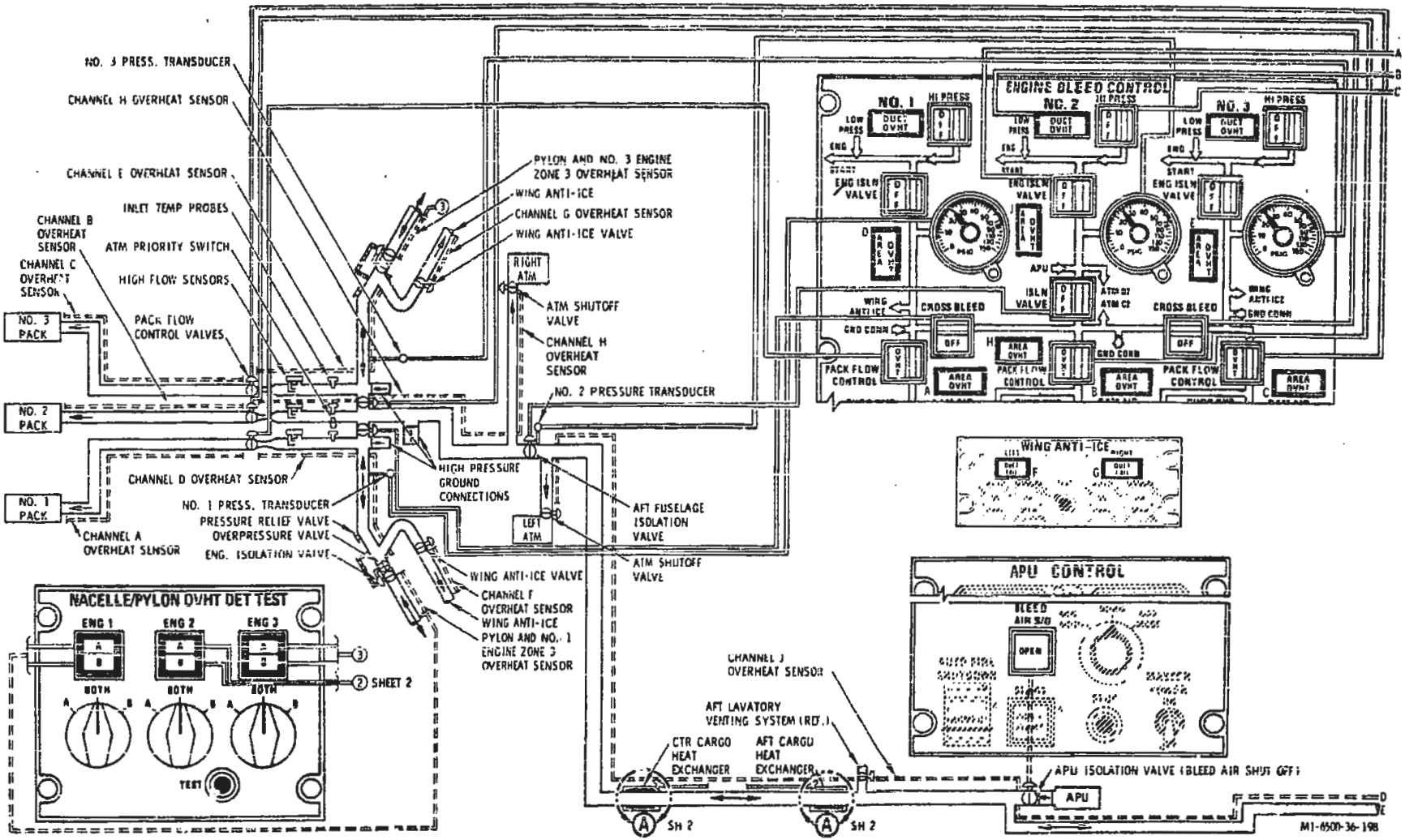
The following is a description of OVHT indication, which should enable maintenance to troubleshoot system problems related to overheat situations. The item numbers refer to Figure 2 (Sheet 2).

ITEM NO. FROM FIG. 2	FAULT	DESCRIPTION
1	Duct Area Overheat:	-IF light is ON, there is a temperature in excess of 570° F (299° C) in the duct upstream of engine isolation valve.
R		- When the light comes on the engine isolation and high pressure valves are closed automatically.
2	Area Overheat:	- Indicates duct area overtemperature from Engine Isolation Valves to Flow Control Valves. - On No. 2 engine only, to 8-inch isolation Valve. - Has no valve close authority.
3	Area Overheat:	- Indicates duct area overheat from aft fuselage isolation valve to crossbleed manifold and to No. 2 flow control valve. - No valve close authority.

	ITEM NO. FROM FIG. 2	FAULT	DESCRIPTION
	4	Pack Flow Control OVHT:	- The Pack Flow Control Valve regulates air flow to refrigeration pack. - OVHT legend illuminated indicates possibly: - Compressor discharge temperature is above 425 degrees F (218 degrees C). - Pack discharge is above 205 degrees F (96 degrees C).
	5	Area Overheat:	- Indicates duct area overheat from the flow control valve to the refrigeration pack. - Has no valve close authority.
R	6	Isolation Valve OVHT:	- The hot Manifold Isolation Valve closes off respective trim air supply and opens when the pack flow control valve opens for packs 2 and 3 operation. - OVHT legend illuminated indicates that the FESC area overheat sensor has been actuated to command valve closed. - FLOW BAR legend illuminated indicates that the valve is open - FLOW BAR legend off indicates the valve is closed by:
R			(a) FESC area overheat sensor at 130 degrees F (54.4 degrees C).
R			(b) Compressor discharge temperature at 425 degrees F (218 degrees C).
R			(c) Pack Discharge Temperature at 205 degrees F (96 degrees C).
R			(d) Pack flow control valve commanded close.
R			(e) No pneumatic pressure.
R			(f) Switchlight actuated to energize the close solenoid.
R			(g) No. 2 ATM priority switch actuated.
R			(h) High flow lockout sensor contacts closed. - Temperature overheats will cause a lockout relay to actuate. - PUSH-PUSH of switchlight will reset lockout relay.

ITEM NO. FROM FIG. 2	FAULT	DESCRIPTION
7	Duct Overheat:	The zone trim overtemperature switch will actuate at 290 degrees F (143.3 degrees C), illuminating the DUCT OVHT light which commands the hot manifold temperature control valves to close. - Prevents trim air temperature from exceeding the temperature output of the primary heat exchanger. - Senses trim air from isolation valves to trim air distribution duct.

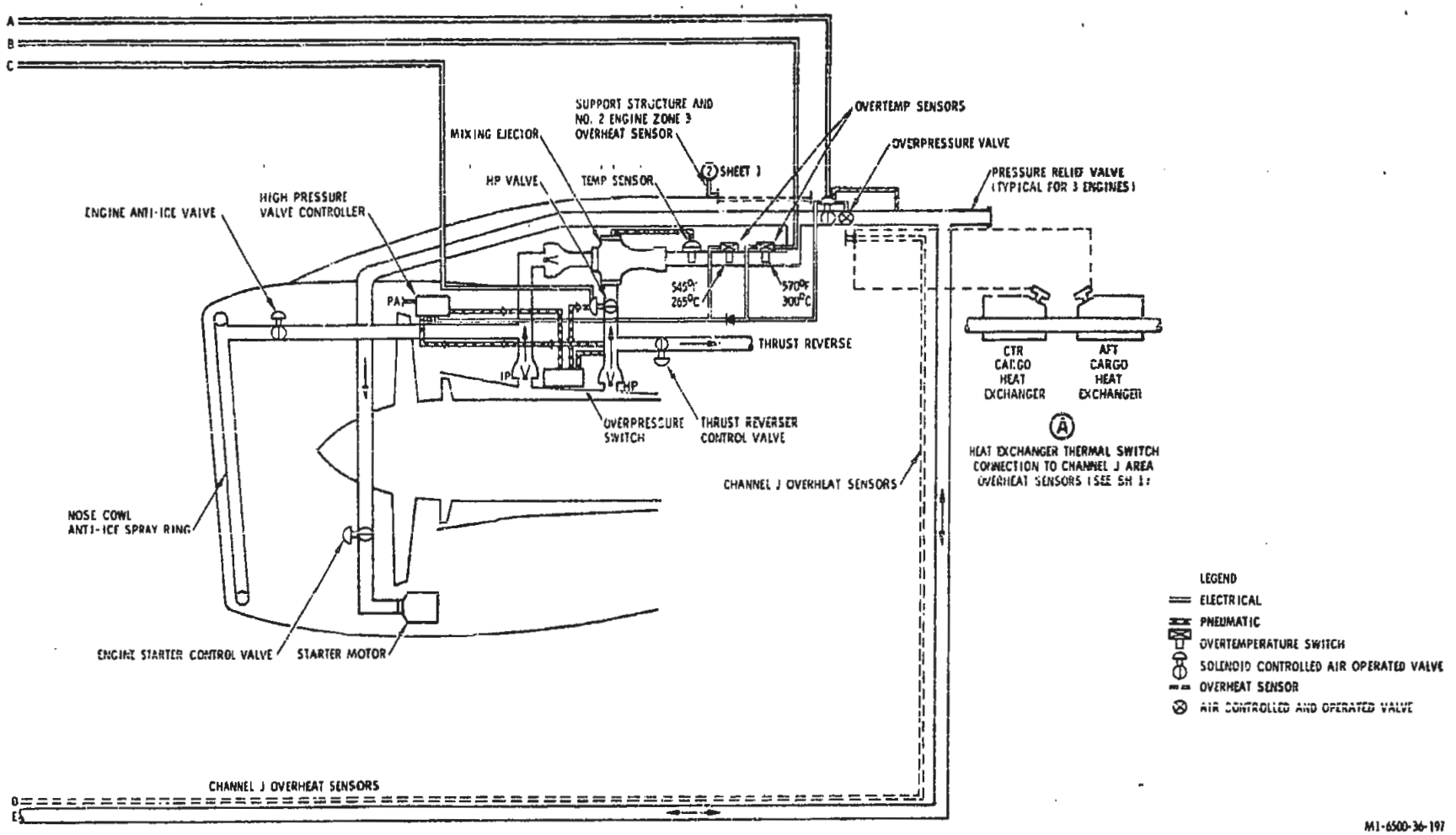
R



Integrated Pneumatic System Schematic
Figure 1 (Sheet 1)

EFFECTIVITY: ALL

0018

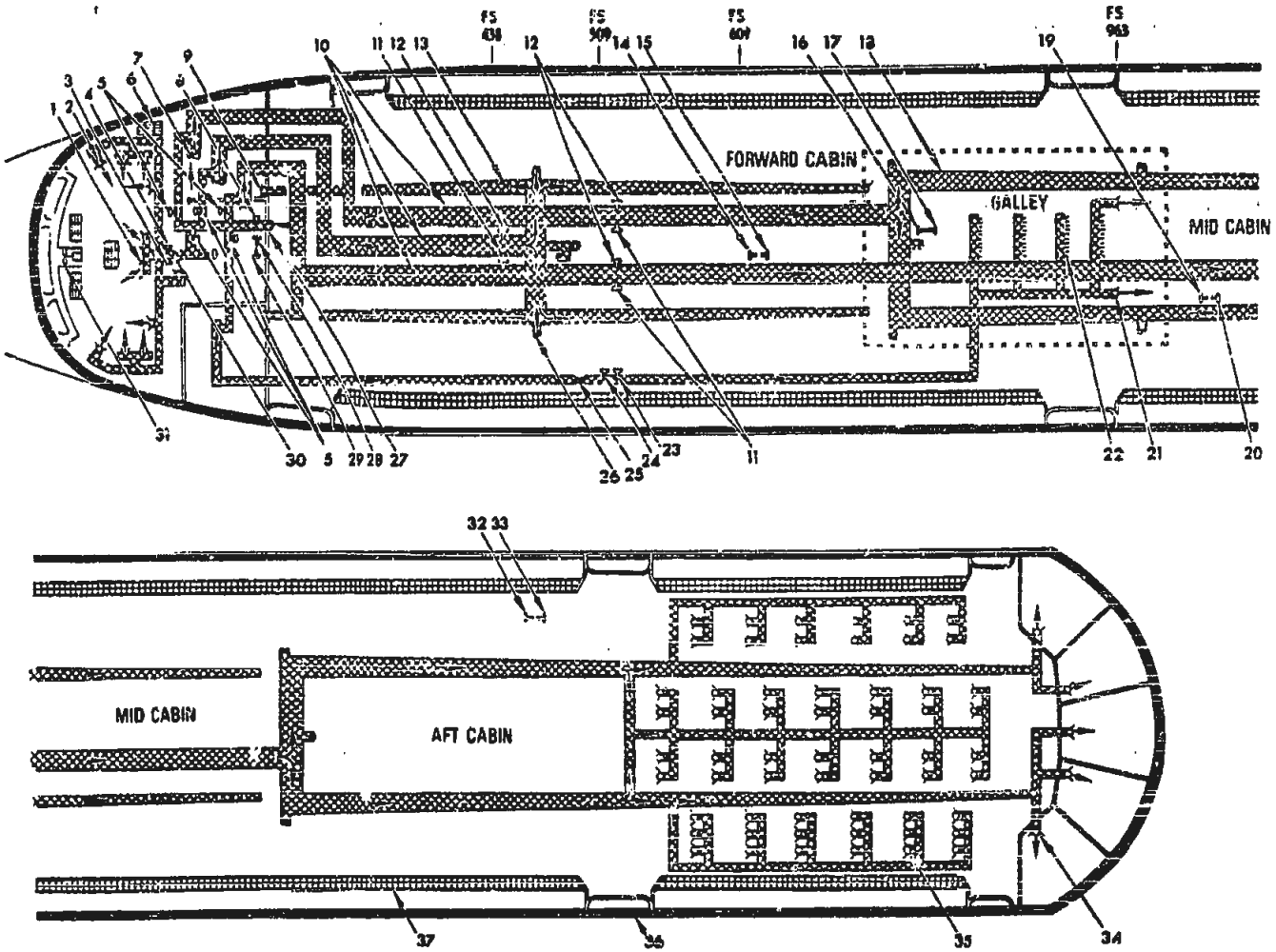


R
R

Integrated Pneumatic System Schematic
Figure 1 (Sheet 2)

EFFECTIVITY: ALL

001B

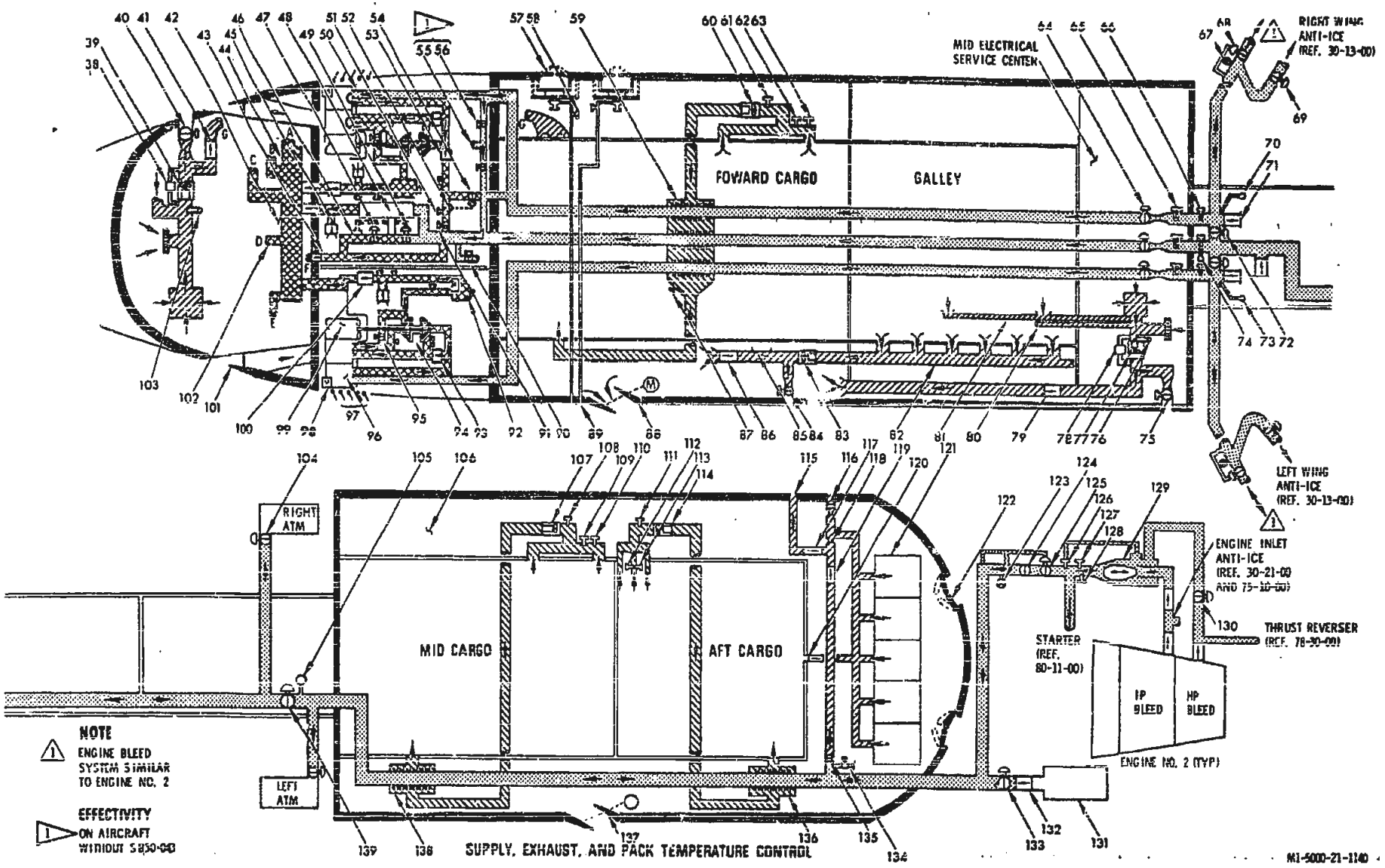


1 FLIGHT STATION FRESH AIR OUTLET (3) (21-22)
2 FLIGHT CREW INDIVIDUAL AIR OUTLET (5) (21-22)
3 FLIGHT STATION DUCT TEMPERATURE SENSOR (21-63)
4 FLIGHT STATION DUCT TEMPERATURE SENSOR (21-61)
5 ZONE TRIM CONTROL VALVE (5) (21-61)
6 FLIGHT STATION EXHAUST TO FWD ELECTRONICS (TYP) (21-22)
7 TYPICAL CONNECTION TO COLD AIR PLENUM FROM SUPPLY, EXHAUST, AND PACK TEMPERATURE CONTROL (6 PLACES)
8 HOT MANIFOLD DUCT OVER TEMPERATURE SWITCH (21-41)
9 FWD LAVATORY INDIVIDUAL AIR OUTLET (2) (21-26)
10 CABIN OVERHEAD DISTRIBUTION DUCTS (3)
11 CABIN DUCT TEMPERATURE SENSORS (3) (21-61)
12 CABIN DUCT TEMPERATURE SENSORS (3) (21-63)
13 FORWARD CABIN DISTRIBUTION DUCT (21-23)
14 FWD CABIN ZONE TEMPERATURE SENSOR (21-61)
15 FORWARD CABIN ZONE TEMPERATURE SENSOR (21-63)
16 GALLEY ZONE TEMPERATURE SENSOR (21-61)
17 GALLEY ZONE TEMPERATURE SENSOR (21-63)
18 MID CABIN DISTRIBUTION DUCT (21-23)
19 MID CABIN ZONE TEMPERATURE SENSOR (21-61)
20 MID CABIN ZONE TEMPERATURE SENSOR (21-63)
21 GALLEY INDIVIDUAL AIR OUTLET (2) (21-24)
22 GALLEY OVERHEAD FRESH AIR OUTLET, AROUND LIGHT FIXTURE (4) (21-24)
23 GALLEY DUCT TEMPERATURE SENSOR (21-61)
24 GALLEY DUCT TEMPERATURE SENSOR (21-63)
25 GALLEY SUPPLY AIR FLOW CONTROL VALVE (21-24)
26 TO PASSENGER INDIVIDUAL AIR OUTLETS (TYP) (21-23)
27 FROM HOT AIR MANIFOLD (21-41)
28 FLIGHT STATION ZONE TEMPERATURE SENSOR (21-61)
29 FLIGHT STATION ZONE TEMPERATURE SENSOR (21-63)
30 FLIGHT STATION SUPPLY AIR FLOW CONTROL VALVE (21-22)
31 WINDSHIELD DEFOG FAN (30-41)
32 AFT CABIN ZONE TEMPERATURE SENSOR (21-61)
33 AFT CABIN ZONE TEMPERATURE SENSOR (21-63)
34 AFT LAVATORY INDIVIDUAL AIR OUTLET (5) (21-26)
35 PASSENGER INDIVIDUAL AIR OUTLET (TYP) (21-23)
36 CABIN DOOR (8)
37 FLOOR LEVEL CABIN AIR EXHAUST GRILLE (TYP) (21-23)

PNEUMATIC SUPPLY/DISTRIBUTION SYSTEM AIR
AIR CONDITIONING SUPPLY AND DISTRIBUTION
VENTILATION/EXHAUST AIR
CARGO HEAT SYSTEM RECIRCULATED AIR
PRESSURE ENVELOPE

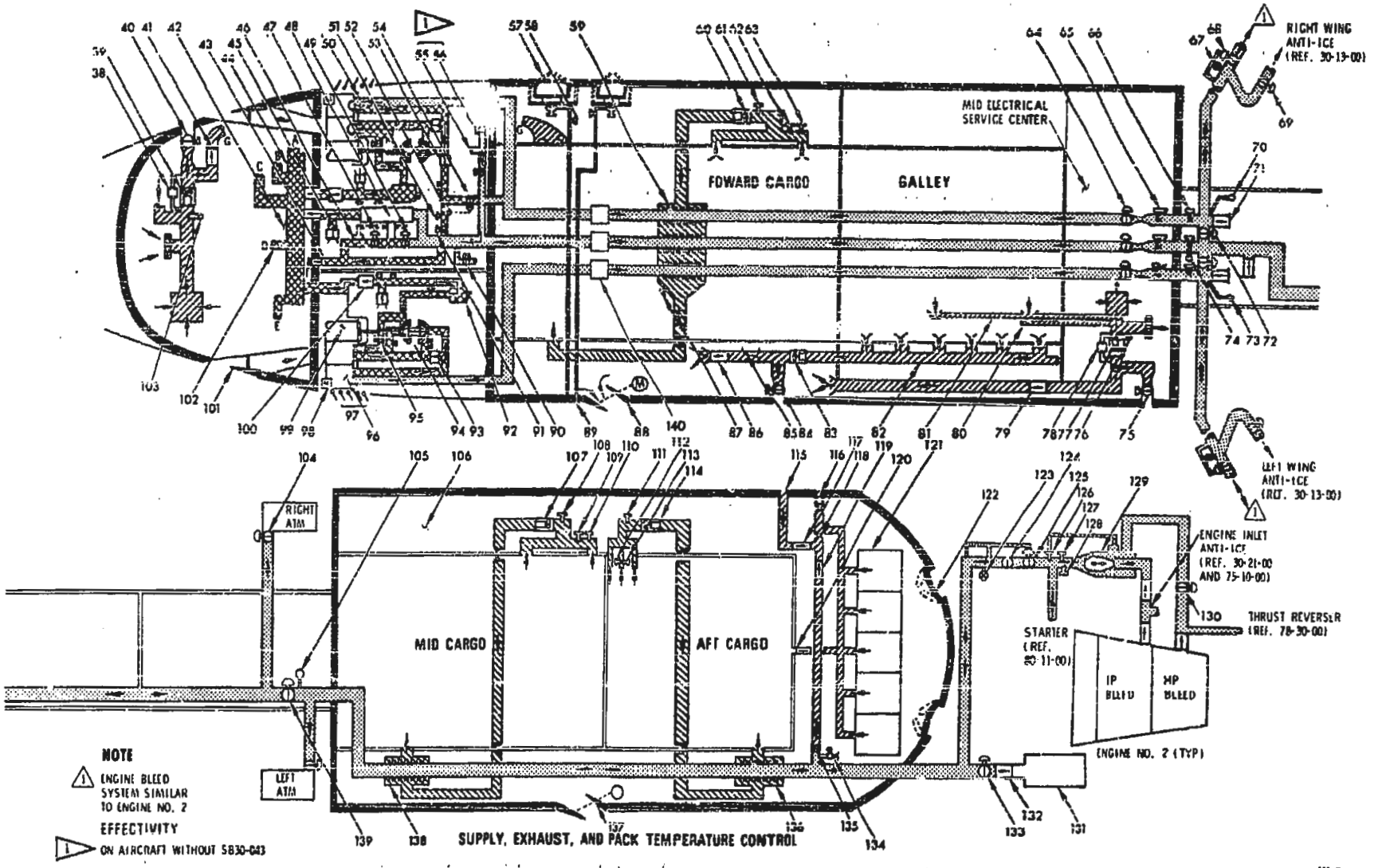
M1-65704-21-004

Integrated Pneumatic System Schematic
Figure 1 (Sheet 3)



Integrated Pneumatic System Schematic
Figure 1 (Sheet 4)

R
R
0018 EFFECTIVITY: 001-031 WITHOUT SB36-018



Integrated Pneumatic System Schematic
Figure 1 (Sheet 4)

R
R
001B EFFECTIVITY: 001-031 WITH SB36-018 AND 032-999

1 THRU 37 SEE SHEET 1

38 FORWARD ELECTRONIC EXHAUST DIFFERENTIAL PRESSURE SWITCH (21-25)
39 FORWARD ELECTRONIC EXHAUST FAN (21-25)
40 FORWARD ELECTRONIC EXHAUST CONTROL VALVE (21-25)
41 FORWARD ELECTRONIC EXHAUST CHECK VALVE (21-25)
42 COLD AIR PLENUM RELIEF VALVE (21-51)
43 ZONE TRIM HOT AIR DISCHARGE CHECK VALVE (21-41)
44 COLD AIR PLENUM (21-51)
45 PRECONDITIONED GROUND AIR CONNECTION (2) (21-21)
46 HOT AIR TEMPERATURE CONTROL SENSOR NO. 2 (21-41)
47 HOT MANIFOLD ISOLATION VALVE NO. 2 (21-41)
48 AIR CYCLE PACK NO. 2 (SAME AS NO. 3)
49 HOT AIR TEMPERATURE CONTROL VALVE NO. 2 (21-41)
50 AIR CYCLE PACK NO. 3 (21-51)
51 HOT MANIFOLD TEMPERATURE SENSOR (2) (21-63)
52 HOT AIR TEMPERATURE CONTROL SENSOR (2) (21-41)
53 HOT AIR MIXING CHECK VALVE (2) (21-41)
54 HOT AIR TEMPERATURE CONTROL VALVE (2) (21-41)
55 VHF ANTENNA ANTI-ICE DUCT (30-51) [1]
56 VHF ANTENNA ANTI-ICE VALVE (2) (30-51) [1]
57 CABIN SAFETY VALVE (2) (21-32)
58 CABIN SAFETY VALVE CONDENSATE BOTTLE (2) (21-32)
59 FORWARD CARGO HEAT EXCHANGER (21-44)
60 FORWARD CARGO FAN (21-44)
61 FORWARD CARGO OVERTEMPERATURE SWITCH (21-44)
62 FORWARD CARGO COLD TEMPERATURE SWITCH (21-44)
63 FORWARD CARGO FAN CYCLE TEMP SWITCH (21-44)
64 PACK FLOW CONTROL VALVE (3) (21-21)
65 PACK EXCESS FLOW SENSOR/BLEED AIR DIFFERENTIAL PRESSURE SWITCH (3) (36-14)
66 PACK INLET TEMPERATURE SENSOR (3) (21-63)
67 WING ENG BLEED AIR PRESS RELIEF VALVE (36-11)
68 ENGINE ISOLATION VALVE (ENG NO. 1 AND NO. 3)
69 WING ANTI-ICE CONTROL VALVE (2) (31-31)
70 NO. 3 BLEED AIR PRESSURE TRANSMITTER (36-21)
71 HIGH PRESSURE GROUND CONNECTION (3) (36-13)
72 CROSS BLEED DUCT ISOLATION VALVE (2) (36-14)
73 NO. 1 BLEED AIR PRESSURE TRANSDUCER (36-21)
74 AMT PRIORITY SWITCH (21-21)
75 MESC EXHAUST CONTROL VALVE (21-25)
76 MESC EXHAUST AIR FLOW SENSOR (21-25)
77 MESC EXHAUST FAN (21-25)
78 MESC EXHAUST DIFF PRESSURE SWITCH (21-25)
79 MESC EXHAUST DUCT CHECK VALVE (21-25)
80 GALLEY SMOKE DETECTOR AIR/SMOKE INLET (26-15)
81 GALLEY CO2 VENT SYSTEM (21-24)
82 GALLEY EXHAUST SYSTEM (21-24)
83 GALLEY EXHAUST FAN (21-24)
84 GALLEY EXHAUST AIR FLOW CONTROL VALVE (21-24)
85 GALLEY EXHAUST DUCT INFLOW RELIEF VALVE (21-24)
86 GALLEY EXHAUST DUCT CHECK VALVE (21-24)
87 FORWARD CARGO DUCT AREA OVHT SWITCH (36-21)
88 FORWARD OUTFLOW VALVE (21-31)
89 CABIN SAFETY VALVE STATIC PORT (2) (21-32)
90 FORWARD LAVATORY VENT AIR CONTROL VALVE (21-26)
91 HOT MANIFOLD ISOLATION VALVE NO. 3 (21-41)
92 WATER SEPARATOR (3) (21-51)
93 COMPRESSOR BYPASS CHECK VALVE (3) (21-51)
94 AIR CYCLE MACHINE (3) (21-51)
95 TURBINE BYPASS VALVE (3) (21-62)
96 DUAL HEAT EXCHANGER (3) (21-51)
97 RAM AIR EXHAUST VALVE (3) (21-62)
98 RAM AIR EXHAUST CONTROL ACTUATOR (3) (21-62)
99 RAM AIR COOLING HEADER AND CHECK VALVE (3) (21-62)
100 PACK DISCHARGE CHECK VALVE (3) (21-51)
101 RAM AIR INLET DOOR (3) (21-62)
102 TYPICAL CONNECTION TO ZONE TEMPERATURE CONTROL, DISTRIBUTION, AND CABIN EXHAUST (6 PLACES)
103 FWD ELECTRONIC EXH AIR FLOW SENSOR (21-25)
104 ATM CONTROL VALVE (2) (29-11)
105 NO. 2 BLEED AIR PRESSURE TRANSMITTER (36-21)
106 AREA OUTBD OF AND BELOW CARGO COMPT (TYP)
107 MID CARGO FAN (21-44)
108 MID CARGO OVERTEMPERATURE SWITCH (21-44)
109 MID CARGO TEMPERATURE SWITCH (21-44)
110 MID CARGO FAN CYCLE SWITCH (21-44)
111 AFT CARGO OVERTEMPERATURE SWITCH (21-44)
112 AFT CARGO COLD TEMPERATURE SWITCH (21-44)
113 AFT CARGO FAN CYCLE SWITCH (21-44)
114 AFT CARGO FAN (21-44)
115 AFT LAVATORY GROUND VENT AIR CONNECTION (21-26)
116 AFT LAVATORY EXHAUST FLOW CONTROL VALVE (21-26)
117 AFT LAVATORY GROUND VENT CHECK VALVE (21-26)
118 AFT LAVATORY VENT AIR JET PUMP (21-26)
119 AFT LAVATORY VENT AIR CHECK VALVE (21-26)
120 AFT CARGO PET AIR EXHAUST CHECK VALVE (21-26)
121 AFT LAVATORY EXHAUST SYSTEM (21-26)
122 NEGATIVE PRESSURE RELIEF VALVE (2) (21-32)
123 OVERPRESSURE RELIEF VALVE (36-11)
124 HIGH-PRESSURE OVERPRESSURE SHUTOFF VALVE (36-11)
125 ENGINE ISOLATION VALVE (ENG NO. 2) (36-11)
126 MIXING EJECTOR PNEU TEMP SENSOR (36-11)
127 BLEED AIR OVERTEMP SWITCH (2 EACH SYSTEM) (36-11)
128 BLEED TEMPERATURE SEQUENCE SWITCH (36-11)
129 BLEED AIR MIXING EJECTOR (36-11)
130 ENGINE HIGH PRESSURE BLEED VALVE (36-11)
131 APU LOAD COMPRESSOR (49-00)
132 APU LOAD COMPRESSOR DUCT CHECK VALVE (49-51)
133 APU LOAD COMPRESSOR DUCT ISOLATION VALVE (36-12)
134 AFT WASTE COMPT HEAT (AFT LAV UNDERFLOOR) (30-71)
135 AFT LAVATORY VENT AIR CONTROL VALVE (21-26)
136 AFT CARGO HEAT EXCHANGER (21-44)
137 AFT OUTFLOW VALVE (21-31)
138 MID CARGO HEAT EXCHANGER (21-44)
139 AFT FUSELAGE DUCT ISOLATION VALVE (36-14)

EFFECTIVITY

[1] ON AIRCRAFT WITHOUT SB30-043

M1-5000-21-1132

Integrated Pneumatic System Schematic
Figure 1 (Sheet 5)

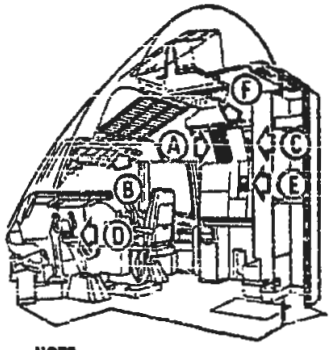
1 THRU 37 SEE SHEET 1

38 FORWARD ELECTRONIC EXHAUST DIFFERENTIAL PRESSURE SWITCH (21-25)
39 FORWARD ELECTRONIC EXHAUST FAN (21-25)
40 FORWARD ELECTRONIC EXHAUST CONTROL VALVE (21-25)
41 FORWARD ELECTRONIC EXHAUST CHECK VALVE (21-25)
42 COLD AIR PLENUM RELIEF VALVE (21-51)
43 ZONE TRIM HOT AIR DISCHARGE CHECK VALVE (21-41)
44 COLD AIR PLENUM (21-51)
45 PRECONDITIONED GROUND AIR CONNECTION (2) (21-21)
46 HOT AIR TEMPERATURE CONTROL SENSOR NO. 2 (21-41)
47 HOT MANIFOLD ISOLATION VALVE NO. 2 (21-41)
48 AIR CYCLE PACK NO. 2 (SAME AS NO. 3)
49 HOT AIR TEMPERATURE CONTROL VALVE NO. 2 (21-41)
50 AIR CYCLE PACK NO. 3 (21-51)
51 HOT MANIFOLD TEMPERATURE SENSOR (2) (21-63)
52 HOT AIR TEMPERATURE CONTROL SENSOR (2) (21-41)
53 HOT AIR MIXING CHECK VALVE (2) (21-41)
54 HOT AIR TEMPERATURE CONTROL VALVE (2) (21-41)
55 VHF ANTENNA ANTI-ICE DUCT (30-51) } 1
56 VHF ANTENNA ANTI-ICE VALVE (2) (30-51) }
57 CABIN SAFETY VALVE (2) (21-32)
58 CABIN SAFETY VALVE CONDENSATE BOTTLE (2) (21-32)
59 FORWARD CARGO HEAT EXCHANGER (21-44)
60 FORWARD CARGO FAN (21-44)
61 FORWARD CARGO OVERTEMPERATURE SWITCH (21-44)
62 FORWARD CARGO COLD TEMPERATURE SWITCH (21-44)
63 FORWARD CARGO FAN CYCLE TEMPERATURE SWITCH (21-44)
64 PACK FLOW CONTROL VALVE (3) (21-21)
65 PACK EXCESS FLOW SENSOR/BLEED AIR DIFFERENTIAL PRESSURE SWITCH (3) (36-14)
66 PACK INLET TEMPERATURE SENSOR (3) (21-63)
67 WING ENGINE BLEED AIR PRESSURE RELIEF VALVE (36-11)
68 ENGINE ISOLATION VALVE (ENG NO. 1 AND NO. 3)
69 WING ANTI-ICE CONTROL VALVE (2) (31-13)
70 NO. 3 BLEED AIR PRESSURE TRANSMITTER (36-21)
71 HIGH PRESSURE GROUND CONNECTION (3) (36-13)
72 CROSS BLEED DUCT ISOLATION VALVE (2) (36-14)
73 NO. 1 BLEED AIR PRESSURE TRANSDUCER (36-21)
74 AMT PRIORITY SWITCH (21-21)
75 MID ELECTRICAL SERVICE CENTER EXHAUST CONTROL VALVE (21-25)
76 MID ELECTRICAL SERVICE CENTER EXHAUST AIR FLOW SENSOR (21-25)
77 MID ELECTRICAL SERVICE CENTER EXHAUST FAN (21-25)
78 MID ELECTRICAL SERVICE CENTER EXHAUST DIFFERENTIAL PRESSURE SWITCH (21-25)
79 MID ELECTRICAL SERVICE CENTER EXHAUST DUCT CHECK VALVE (21-25)
80 GALLEY SMOKE DETECTOR AIR/SMOKE INLET (26-15)
81 GALLEY CO2 VENT SYSTEM (21-24)
82 GALLEY EXHAUST SYSTEM (21-24)
83 GALLEY EXHAUST FAN (21-24)
84 GALLEY EXHAUST AIR FLOW CONTROL VALVE (21-24)
85 GALLEY EXHAUST DUCT INFLOW RELIEF VALVE (21-24)
86 GALLEY EXHAUST DUCT CHECK VALVE (21-24)
87 FORWARD CARGO DUCT LEAK/AREA OVERHEAT SWITCH (36-21)
88 FORWARD OUTFLOW VALVE (21-31)
89 CABIN SAFETY VALVE STATIC PORT (2) (21-32)
90 FORWARD LAVATORY VENT AIR CONTROL VALVE (21-26)
91 HOT MANIFOLD ISOLATION VALVE NO. 3 (21-41)
92 WATER SEPARATOR (3) (21-51)
93 COMPRESSOR BYPASS CHECK VALVE (3) (21-51)
94 AIR CYCLE MACHINE (3) (21-51)
95 TURBINE BYPASS VALVE (3) (21-62)
96 DUAL HEAT EXCHANGER (3) (21-51)
97 RAM AIR EXHAUST VALVE (3) (21-62)
98 RAM AIR EXHAUST CONTROL ACTUATOR (3) (21-62)
99 RAM AIR COOLING HEADER AND CHECK VALVE (3) (21-62)
100 PACK DISCHARGE CHECK VALVE (3) (21-51)
101 RAM AIR INLET DOOR (3) (21-62)
102 TYPICAL CONNECTION TO ZONE TEMPERATURE CONTROL, DISTRIBUTION, AND CABIN EXHAUST (6 PLACES)
103 FORWARD ELECTRONIC EXHAUST AIR FLOW SENSOR (21-25)
104 ATM CONTROL VALVE (2) (29-11)
105 NO. 2 BLEED AIR PRESSURE TRANSMITTER (36-21)
106 AREA OUTBD OF AND BELOW CARGO COMPT (TYP)
107 MID CARGO FAN (21-44)
108 MID CARGO OVERTEMPERATURE SWITCH (21-44)
109 MID CARGO TEMPERATURE SWITCH (21-44)
110 MID CARGO FAN CYCLE SWITCH (21-44)
111 AFT CARGO OVERTEMPERATURE SWITCH (21-44)
112 AFT CARGO COLD TEMPERATURE SWITCH (21-44)
113 AFT CARGO FAN CYCLE SWITCH (21-44)
114 AFT CARGO FAN (21-44)
115 AFT LAVATORY GROUND VENT AIR CONNECTION (21-26)
116 AFT LAVATORY EXHAUST FLOW CONTROL VALVE (21-26)
117 AFT LAVATORY GROUND VENT CHECK VALVE (21-26)
118 AFT LAVATORY VENT AIR JET PUMP (21-26)
119 AFT LAVATORY VENT AIR CHECK VALVE (21-26)
120 AFT CARGO PET AIR EXHAUST CHECK VALVE (21-26)
121 AFT LAVATORY EXHAUST SYSTEM (21-26)
122 NEGATIVE PRESSURE RELIEF VALVE (2) (21-32)
123 OVERPRESSURE RELIEF VALVE (36-11)
124 HP OVERPRESSURE SHUTOFF VALVE (36-11)
125 ENGINE ISOLATION VALVE (ENG NO. 2) (36-11)
126 MIXING EJECTOR PNEU TEMP SENSOR (36-11)
127 BLEED AIR OVERTEMP SWITCH (2 EA SYSTEM) (36-11)
128 BLEED TEMPERATURE SEQUENCE SWITCH (36-11)
129 BLEED AIR MIXING EJECTOR (36-11)
130 ENGINE HIGH PRESSURE BLEED VALVE (36-11)
131 APU LOAD COMPRESSOR (49-00)
132 APU LOAD COMPRESSOR DUCT CHECK VALVE (49-51)
133 APU LOAD COMPRESSOR DUCT ISOLATION VALVE (36-12)
134 AFT WASTE COMPT HEAT (AFT LAV UNDERFLOOR) (30-71)
135 AFT LAVATORY VENT AIR CONTROL VALVE (21-26)
136 AFT CARGO HEAT EXCHANGER (21-44)
137 AFT OUTFLOW VALVE (21-31)
138 MID CARGO HEAT EXCHANGER (21-44)
139 AFT FUSELAGE DUCT ISOLATION VALVE (36-14)
140 BLEED AIR CLEANER (3) (21-21)

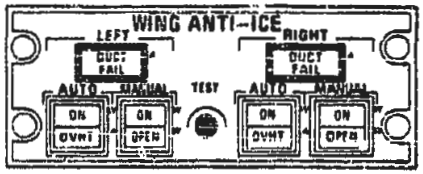
1 EFFECTIVITY ON AIRCRAFT WITHOUT SB30-063

M1-5001-21-098

Integrated Pneumatic System Component Listing
Figure 1 (Sheet 5)



NOTE
SEE SHEET 1 FOR VIEW (A)



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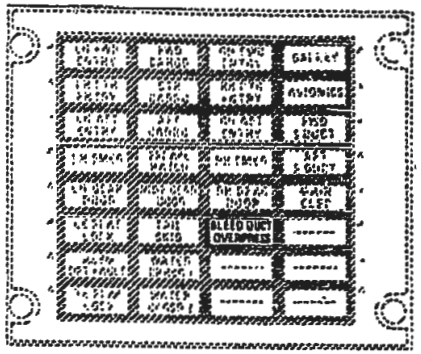
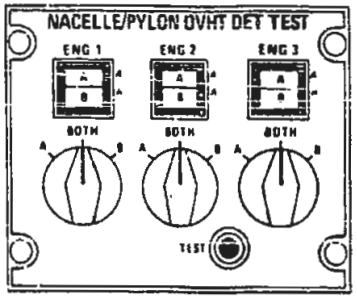
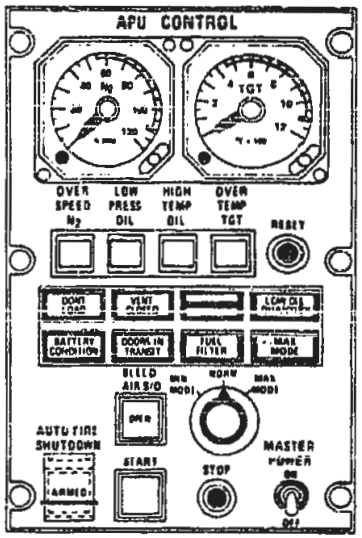


(C)
FLIGHT ENGINEER/SECOND OFFICERS ANNUNCIATOR PANEL



(F)



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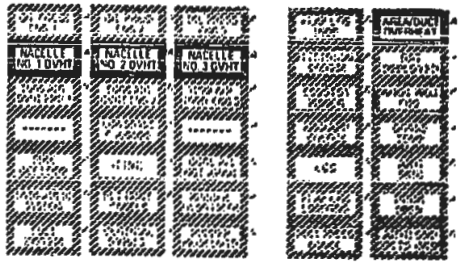
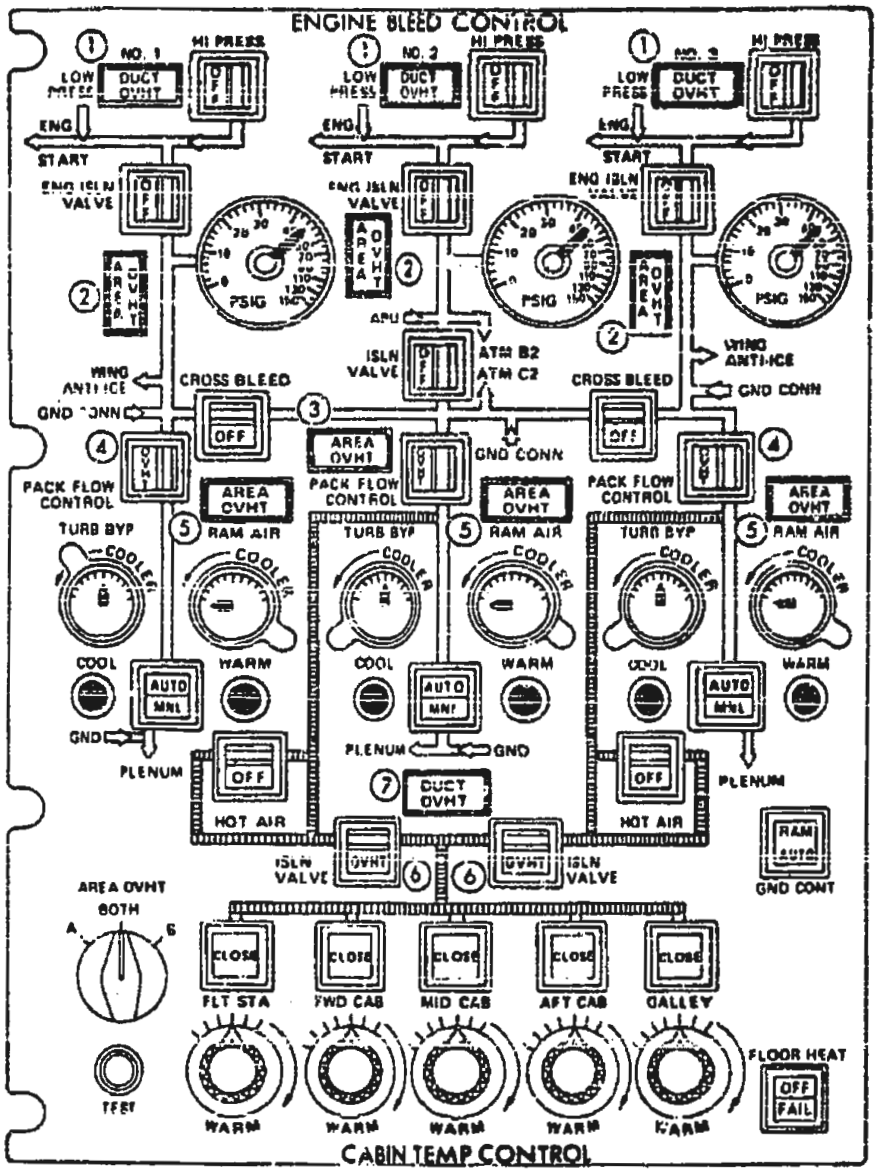


(D)
PILOTS CAUTION AND WARNING ANNUNCIATOR PANEL

M1-5104-75-075

Integrated Pneumatic System Control Panels
Figure 2 (Sheet 1)



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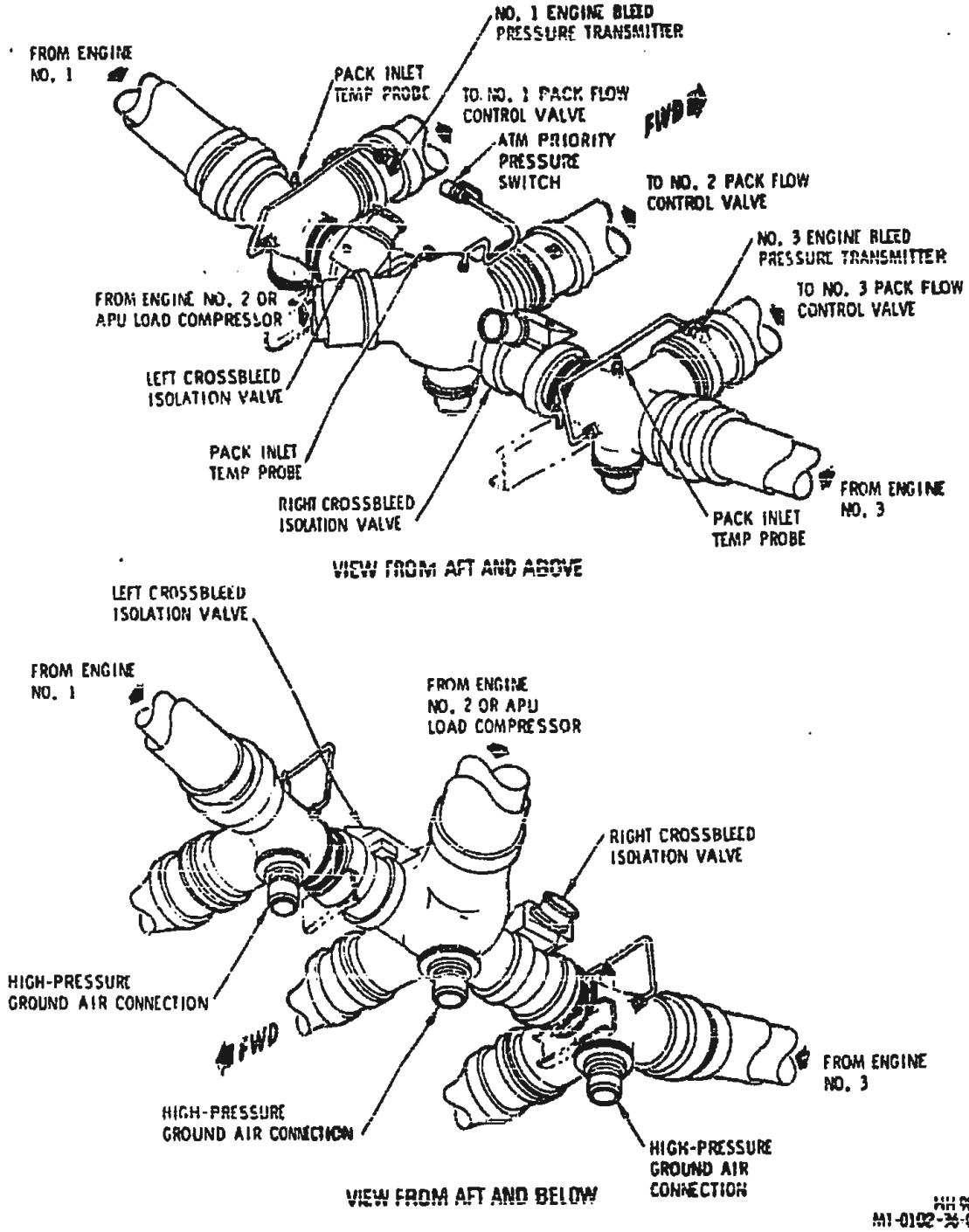
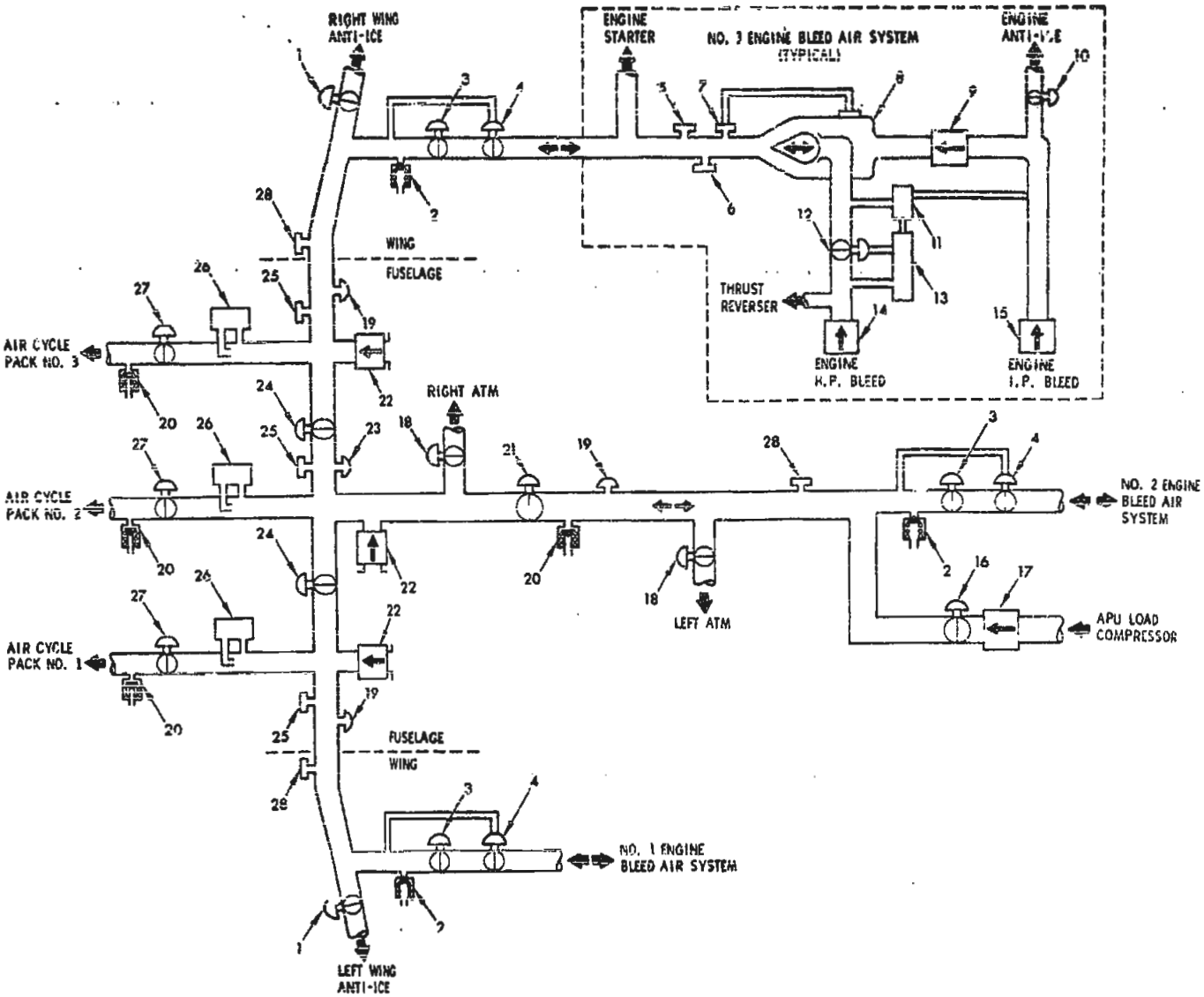
M1-1602-36-074

Integrated Pneumatic System Control Panels
Figure 2 (Sheet 2)


FROM ENGINE NO. 1
PACK INLET TEMP PROBE
NO. 1 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 1 PACK FLOW CONTROL VALVE
FWD
ATM PRIORITY PRESSURE SWITCH
TO NO. 2 PACK FLOW CONTROL VALVE
NO. 3 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
LEFT CROSSBLEED ISOLATION VALVE
PACK INLET TEMP PROBE
RIGHT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 3
PACK INLET TEMP PROBE
VIEW FROM AFT AND ABOVE
LEFT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 1
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
RIGHT CROSSBLEED ISOLATION VALVE
HIGH-PRESSURE GROUND AIR CONNECTION
FWD
FROM ENGINE NO. 3
HIGH-PRESSURE GROUND AIR CONNECTION
HIGH-PRESSURE GROUND AIR CONNECTION
VIEW FROM AFT AND BELOW
M1-0102-36-004

Crossbleed Manifold
Figure 3



1 ANTI-ICE REGULATING/SHUTOFF VALVE (30-13-00)
2 OVERPRESSURE RELIEF VALVE (36-11-00)
3 OVERPRESSURE SHUTOFF VALVE (36-11-00)
4 ENGINE ISOLATION VALVE (36-11-00)
5 TEMPERATURE SEQUENCE SWITCH (36-11-00)
6 OVERTEMPERATURE SWITCH (36-11-00)
7 MIXING EJECTOR TEMPERATURE SENSOR (36-11-00)
8 MIXING EJECTOR (36-11-00)
9 I. P. ANTI-ICE CHECK VALVE (36-11-00)
10 ANTI-ICE REGULATING/SHUTOFF VALVE (30-21-00)
11 HIGH-PRESSURE VALVE CONTROLLER (36-11-00)
12 HIGH-PRESSURE VALVE (36-11-00)
13 HIGH-PRESSURE OVERPRESSURE SWITCH (36-11-00)
14 HIGH-PRESSURE CHECK VALVE (75-00-00)
15 INTERMEDIATE PRESSURE CHECK VALVE (75-00-00)
16 APU DISCHARGE DUCT ISOLATION VALVE (36-12-00)
17 APU DISCHARGE CHECK VALVE (49-51-00)
18 ATM CONTROL VALVE (29-11-00)
19 PRESSURE TRANSMITTER (36-21-00)
20 CONDENSATE DRAIN VALVE (36-14-00)
21 AFT FUSELAGE DUCT ISOLATION VALVE (36-14-00)
22 HIGH PRESSURE GROUND AIR CONNECTION AND CHECK VALVE (36-13-00)
23 ATM PRIORITY PRESSURE SENSOR (21-21-00)
24 CROSSBLEED DUCT ISOLATION VALVE (36-14-00)
25 PACK INLET TEMPERATURE SENSOR (21-63-00)
26 AIR DIFFERENTIAL PRESSURE SWITCH (36-14-00)
27 PACK FLOW CONTROL VALVE (21-21-00)
28 AIDS TEMPERATURE SENSOR (36-11-00)

MI-0004-36-111

R R Distribution Manifold System Schematic
Figure 4

EFFECTIVITY: ALL

0018

PNEUMATIC SYSTEM - MAINTENANCE PRACTICES

1. General

The procedures for operating the aircraft pneumatic system are contained in four tables. The first table (Table 201) includes all initialization. The second, third and fourth (Tables 202-204) list the actions and indications for the three modes (high pressure ground air, APU and engine bleed air) of pneumatic supply.

2. Referenced Procedures

	21-00-00	Air Conditioning System - Maintenance Practices
	24-00-00	Electrical Power - Maintenance Practices
	24-24-00	APU Generator System - Maintenance Practices
	29-11-00	Hydraulic Power System - Maintenance Practices
	30-13-00	Wing Anti-ice System - Maintenance Practices
	30-21-00	Engine Anti-ice System - Maintenance Practices
R R	30-51-00	VHF Antenna Anti-Ice System - Maintenance Practices (On aircraft without SB30-043)
	49-00-00	Airborne Auxiliary Power - Maintenance Practices
	71-00-00	Power Plant - Adjustment and Test

3. Maintenance Practices

This maintenance practice contains the procedures for operating the pneumatic system in various modes. The procedures are presented in tabular form, listing the control, its location, the required action, and the normal resulting flight station indication.

These procedures assume that all systems are properly serviced and operational. If the indications obtained are not as listed, refer to the applicable fault isolation procedure. Further assumption is made that electrical power is on the aircraft buses (Ref. 24-00-00 and 24-24-00) and that all required circuit breakers are closed (Ref. Table 201). Before applying pneumatic pressure, verify that all interfacing systems (Air Conditioning System 21-00-00, ATM 29-11-00, Wing Anti-ice System 30-13-00,

Engine Anti-ice System 30-21-00, VHF Antenna Anti-ice System 30-51-00, and Engine Starting System 71-00-00) can be operated safely.

4. Pneumatic System Operating Procedures

A. Initialization

Initialize the pneumatic system by closing the circuit breakers listed in Table 201.

The following abbreviations are used in the location column of the tables:

CB1 - Pilots overhead circuit breaker panel, zone 210.

CB2 - Flight Engineer/Second Officers overhead circuit breaker panel, zone 215.

CB3 - Flight Engineer/Second Officers aft circuit breaker panel, zone 215.

EBC - ENGINE BLEED CONTROL panel, zone 215

Initialization
Table 201

CIRCUIT BREAKER	CIRCUIT BREAKER PANEL	PANEL MATRIX
ENGINE NO. 1 ISOLATION VALVE	CB1	G10
ENGINE NO. 2 ISOLATION VALVE	CB1	G11
ENGINE NO. 3 ISOLATION VALVE	CB1	G12
ENGINE NO. 1 BLEED CONTROL HI PRESS VALVE	CB1	G13
ENGINE NO. 2 BLEED CONTROL HI PRESS VALVE	CB1	G14
ENGINE NO. 3 BLEED CONTROL HI PRESS VALVE	CB1	G15
FUSELAGE ISLN VALVE	CB1	G17
LEFT CROSS BLEED VALVE	CB1	G18
RIGHT CROSS BLEED VALVE	CB1	G19

Initialization (Cont)
Table 201

CIRCUIT BREAKER	CIRCUIT BREAKER PANEL	PANEL MATRIX
ECS SCHEDULE ENG NO. 1 (On aircraft 028 and 029)	CB1	H8
ECS SCHEDULE ENG NO. 3 (On aircraft 028 and 029)	CB1	H9
THRUST REVERSER ENGINE NO. 1	CB1	H16
THRUST REVERSER ENGINE NO. 2	CB1	H17
THRUST REVERSER ENGINE NO. 3	CB1	H18
ENGINE NO. 1 ANTI-ICE	CB2	D15
ENGINE NO. 2 ANTI-ICE	CB2	D19
ENGINE NO. 3 ANTI-ICE	CB2	D20
WING ANTI-ICE	CB2	D22
AVIONICS AIR MON	CB2	L5
BAT CHG INTLK	CB2	L6
ECS IND LT	CB3	G12
BLEED AIR IND	CB3	R17
CARGO TEMP MID-FWD	CB3	W9
OVHT DET DC	CB3	W13
OVHT DET AC	CB3	W14
FWD AVIONICS FAN	GALLEY	RIGHT
FAN - AVIONICS RACK - MAIN	GALLEY	LEFT

B. High Pressure Ground Air Operation

R R R R Connect high pressure ground air (Ref. 36-13-00) supply to the GND CONN and open or close valves by depressing or releasing appropriate Engine Bleed Control Switchlights (Ref. Table 202).

High Pressure Ground Air Operation
Table 202

		CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
R R R	1	No. 1 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	2	No. 2 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	3	No. 3 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	4	No. 1 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	5	No. 2 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	6	No. 3 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
R R R	7	Fuselage ISLN VALVE switchlight	EBC	Depressed	Flowbar LT on, OFF LT out
R R R	8	Left CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT on, OFF LT out
R R R	9	Right CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT on, OFF LT out
R	10	No. 1 DUCT OVHT light	EBC	-	Off LT out
R	11	No. 2 DUCT OVHT light	EBC	-	Off LT out
R	12	No. 3 DUCT OVHT light	EBC	-	Off LT out

High Pressure Ground Air Operation (Cont)
Table 202

	CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
13	No. 1 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
14	No. 2 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
15	No. 3 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out

C. APU Load Compressor Bleed Air Operation

APU BLEED AIR Operation
Table 203

	CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
1	No. 1 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
2	No. 2 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
3	No. 3 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
4	No. 1 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
5	No. 2 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on

APU BLEED AIR Operation (Cont)
Table 203

		CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
	6	No. 3 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
R	7	Fuselage ISLN VALVE switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R	8	Left CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R	9	Right CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
	10	No. 1 DUCT OVHT light	EBC	-	Out
	11	No. 2 DUCT OVHT light	EBC	-	Out
	12	No. 3 DUCT OVHT light	EBC	-	Out
	13	No. 1 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
	14	No. 2 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
	15	No. 3 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
	16	BLEED AIR S/O valve switchlight	APU	Released	OPEN LT out
		Start APU (Ref. 49-00-00 Maintenance Practices)			
	17	BLEED AIR S/O valve switchlight	APU CONTROL	Depressed	OPEN LT on

D. Engine Bleed Air Operation

ENGINE BLEED AIR Operation
Table 204

		CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
	1	No. 1 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
	2	No. 2 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
	3	No. 3 HI PRESS switchlight	EBC	Released	Flowbar LT out, OFF LT on
	4	No. 1 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
	5	No. 2 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
	6	No. 3 ENG ISLN VALVE switchlight	EBC	Released	Flowbar LT out, OFF LT on
R	7	Fuselage ISLN VALVE switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R	8	Left CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R	9	Right CROSS BLEED valve switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
	10	No. 1 DUCT OVHT light	EBC	-	Out
	11	No. 2 DUCT OVHT light	EBC	-	Out
	12	No. 3 DUCT OVHT light	EBC	-	Out

ENGINE BLEED AIR Operation (Cont)
Table 204

		CONTROL OR INDICATOR	LOCATION	ACTION OR CONTROL POSITION	FLT STATION INDICATION
	13	No. 1 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
	14	No. 2 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
	15	No. 3 PACK FLOW CONTROL valve switchlight	EBC	Released	Flowbar LT out, OVHT LT out
		Start Engines (Ref. 71-00-00 Power Plant Adjustment and Test)			
R R	16	No. 1 HI PRESS switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R R	17	No. 2 HI PRESS switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
R R	18	No. 3 HI PRESS switchlight	EBC	Depressed	Flowbar LT ON, OFF LT out
	19	No. 1 ENG ISLN VALVE switchlight	EBC	Depressed	Flowbar LT on, OFF LT out
	20	No. 2 ENG ISLN VALVE switchlight	EBC	Depressed	Flowbar LT on, OFF LT out
	21	No. 3 ENG ISLN VALVE switchlight	EBC	Depressed	Flowbar LT on, OFF LT out

R

PNEUMATIC SYSTEM - INSPECTION AND CHECK

R 1. General

R The following procedure is to be used to check the pneumatic system ducting for leaks. This procedure should be followed whenever system components are removed and replaced, in order to verify system integrity.

R Referenced Procedures

R 71-00-01 Wing-Mounted QEC Unit - Maintenance Practices

R 71-00-03 Fuselage Mounted QEC Unit - Maintenance Practices

R 3. Equipment and Materials

R Wing and engine anti-ice system test set P/N D-6801-TSD (F-20212), or equivalent

R Bleed air duct coupling kit P/N B-6802-TSB-T1, or equivalent

R Air supply 90-110 psig

R 4. Pneumatic System Pressure Check

R A. Aircraft Preparation

R (1) On FE/SO panel perform the following:

R (a) Unlatch PACK FLOW CONTROL valve switchlights No. 1, 2, and 3, flow bar OFF.

R (b) Unlatch ENG ISLN VALVE switchlight No. 1, 2, and 3, flow bar OFF.

R (c) Unlatch APU BLEED AIR SO valve switchlight, OPEN legend OFF.

R (d) Latch the aft fuselage ISLN VALVE switch, flow bar ON.

R (e) Latch the left and right CROSSBLEED valve switchlights, flow bar ON.

R (f) Turn the ATM 1 and 2 control switches to OFF.

(2) On pilot's overhead panel, unlatch LEFT and RIGHT WING ANTI-ICE switchlights, ON legend OFF.

(3) Visually verify the following valves are in agreement with the associated switchlights and install locking devices.

(a) Pack flow control valves 1, 2, and 3 are closed.

(b) Engine isolation valves 1, 2, and 3 are closed.

(c) APU bleed air shutoff closed.

(d) Aft fuselage isolation valve open.

(e) Left and right crossbleed valves open.

(f) No. 1 and 2 ATM control valve closed.

(4) On pilots overhead circuit breaker panel, CB1, open and tag RAT AUTO DEPLOY (L3).

(5) On the anti-ice test set verify the following valve positions:

MV-1 closed

MV-2 open

MV-3 open

MV-4 closed

MV-5 closed

MV-6 closed

MV-7 open

MV-11 open

(6) Turn knobs PR-1 and PR-2 fully counterclockwise to avoid pressurizing lines when MV-1 is opened.

(7) Connect test set to shop air supply.

(8) Connect test set to the center ground air connector using bleed air duct coupling kit.

(9) Open MV-1 valve, then adjust PR-2 slowly until pressure reading of 45 to 55 psi on test gage PG-4 is obtained. Allow pressure to stabilize for 15 minutes.

R (10) Record pressure after pressure has stabilized.

R (11) Close valve MV-1 on test set.

R (12) Observe pressure drop on test gage PG-4. Leakage shall not exceed a pressure decay rate of 8.3 psi in 15 seconds.

R (13) If leakage rate exceed that previously specified, open valve MV-1 and check for leaks by listening or with mild soap solution and correct as required. Repeat Steps 4A(9) through 4A(12) until requirements are met.

R (14) Adjust PR-2 regulator slowly until a pressure reading of 95 to 100 psi is noted on test gage PG-4. Allow pressure to stabilize for 15 minutes.

R NOTE: If pressure should exceed 100 psi, the test set safety valve will relieve pressure.

R (15) Record pressure after pressure has stabilized.

R (16) Close valve MV-1 on test set.

R (17) Note pressure decay in 15 seconds.

R (18) Repeat Step 4A(9) through 4A(13).

R (19) Verify valve MV-1 is closed.

R (20) Disconnect test set from aircraft and disconnect shop air from test set.

R (21) On pilots overhead circuit breaker panel, remove tag and close RAT AUTO DEPLOY (L3).

R (22) Remove locking devices from valves locked in Steps 4A(3)(a) through 4A(3)(f).

R (23) Leak check engine bleed air ducting as required (Ref. 71-00-01, 71-00-03).

PNEUMATIC AND ECS DUCTING - CLEANING PROCEDURE

1. General

The following procedures are for cleaning the Pneumatic and ECS system ducting due to engine oil, APU or ACM oil contamination.

NOTE: Based on the known properties of the engine oil (Enco Esso ET0.25), the elevated temperatures achievable within the system may require
R extensive operating time to remove oil residue. Approximately 4 hours of engine operation is needed.

If the cause is engine oil leaking into the
R bleed ports, the normal bleed air temperatures
R (200°C to 260°C) will dissipate oil residue in
R bleed and crossbleed ducts following engine
R replacement (Ref. 71-00-01, 71-00-03).

If the APU is the oil source and the APU is replaced (Ref. 49-00-01), normal bleed air temperatures will dissipate oil residue in bleed and crossbleed ducts.

If the ACM is the oil source, then the ACM should be replaced (Ref. 21-51-07).

R If the oil source is one of the three items
R listed above, there is not normally sufficient heat to dissipate the oil residue within the ECS components and pack ducts.

2. Reference Procedures

21-51-00	Air Cycle System - Description and Operation
21-51-07	Air Cycle Machine - Removal and Installation
21-51-22	Water-separator Removal and Installation
49-00-01	Auxiliary Power Unit (APU) - Removal and Installation
71-00-01	Wing Mounted QEC Unit - Removal and Installation
71-00-03	Fuselage Mounted QEC Unit - Removal and Installation

3. Equipment and Materials

High temperature ground cart.

4. Cleaning the ECS Components and Pack Ducting

A. To produce highest allowable ECS component temperatures (which will be approximately 30° to 50°C above normal), the following procedures are recommended.

(1) Remove water separator coalescer bags, (Ref. 21-51-22) operate without bags.

(2) Use high pressure, high temperature ground cart for maximum input temperature.

NOTE: Use of APU normal mode, on cold days will not provide adequate temperature.

(3) On ECS panel, select Ground Control - Ram auto (This allows highest pack out temperature).

(4) Place pack in auto, select full hot on all temperature control zones. (This will produce 79°C auto control).

(5) Operate as many packs as source allows.

(6) When packs stabilize, switch to manual on packs and maintain ACM discharge at 80° to 90°C.

NOTE: Overheat is 96°C.

(7) Maintain temperature for four hours at each pack. This will remove oil residue from heat exchangers and other higher temperature pack ducts and equipment.

(8) This procedure will also remove much of the oil residue from lower temperature ducting as well.

(9) Install new or cleaned water separator coalescer bags (Ref. 21-51-22).

CR 5. Alternate Cleaning Procedure

CR A. After first report of oil smell, check APU load compressor
CR for indications of oil liberation:

CR (1) Remove flex duct at inlet to load compressor.

CR (2) If center hole in load compressor shaft shows signs of
CR oil set up APU change through MCIMD.

CR (3) Placard APU inoperative until it can be replaced.

CR B. On layover after first report, operate ECS system at
CR elevated temperatures to vaporize traces of oil
CR contamination:

CR (1) Per Standard Procedures, start all engines and run at
CR idle. Close manifold crossbleed valves.

CR (2) Open ground idle circuit breakers CB3N2, CB3N8, CB3N14.
CR (This will place all engines in flight idle mode).

CR (3) Leave cabin doors and flight deck exit open.

CR (4) On ECS panel, select Ground Control - Ram auto (This
CR allows highest pack out temperature).

CR (5) Place pack in auto, select full hot on all temperature
CR control zones. (This will produce 79°C auto control).

CR (6) Operate all three packs.

CR (7) When packs stabilize, switch to manual on packs and
CR maintain ACM discharge at 90°C.

CR NOTE: Overheat is 96°C.

CR (8) Maintain temperature for 30 minutes at each pack. This
CR will remove oil residue from heat exchangers and other
CR higher temperature pack ducts and equipment.

CR NOTE: If flight deck temperature becomes unbearable,
CR it may be necessary to operate one or two packs
CR in cool while checking the third pack.

CR NOTE: ALLOW PACK TEMPERATURES TO STABILIZE TO AMBIENT
CR TEMPERATURES PRIOR TO CLOSING PACK VALVE.

CR (9) This will remove much of the oil residue from lower
CR temperature ducting as well.

CR (10) Close ground idle circut breakers and shut down engines
CR per standard procedures.

CR (11) Install new or cleaned water separator coalescer bags.

CR C. If smell persists on subsequent flight(s), contact MCIEE or
CR MCIES for further troubleshooting instructions.

CR CR D. MCIEE will call out unit replacement based on findings of Step 5.C. above.

CR CR E. After APU or engine change, Step 5.B. must be accomplished before aircraft returns to service.

R R

INTEGRATED PNEUMATIC SYSTEM CONTROL PANEL REMOVAL AND INSTALLATION

1. General

R The Integrated Pneumatic System (IPS) Control Panel is located on the upper section of the Flight Engineer/Second Officers (FE/SO) instrument panel (Ref. Fig. 401).

2. Equipment and Materials

Protective caps

3. Removal/Installation

C C C C C C C C C C C C C Two of the electrical connectors at the rear of the integrated pneumatic system control panel, which contains controls for engine bleed air, air conditioning and cabin pressurization on the Flight Engineers upper panel, are identical on the first six L-1011 aircraft. It is possible to connect these plugs in reverse resulting in several control units and instrument failures. When removal and installation of this panel becomes necessary, tag all connectors for location on the panel. M.O. 89314 (SB21-008) will replace connector 2100-P9 and its receptacle 2100-J9 to prevent inadvertent cross connection. Until the M.O. is completed on airplanes 11001 through 11006, use caution if you are working on this panel.

A. Removal

(1) Open and tag the following circuit breakers:

On pilots overhead circuit breaker panel, CB1, zone 210:

AIR - OVBD (J14),

ENVIR CONTROL SYSTEM - MANUAL CABIN - PRESS CONTROL - FWD (H1),

ENVIR CONTROL SYSTEM - MANUAL CABIN - PRESS CONTROL - AFT (H2),

ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL - 1 (H3),

R ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL
R - 2 (H4),
R ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL
R - 3 (H5),
R ENVIR CONTROL SYSTEM - PACK - HI FLOW - CONT (H6),
R ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG
R - 1 (G10),
R ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG
R - 2 (G11),
R ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG
R - 3 (G12),
R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG
R - 1 (G13),
R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG
R - 2 (G14),
R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG
R - 3 (G15),
R ENGINE BLEED CONTROL - FUS - ISLN - VALVE (G16),
R ENGINE BLEED CONTROL - CROSSBLEED - VALVES
R - L (G17),
R ENGINE BLEED CONTROL - CROSSBLEED - VALVES
R - R (G18).

R On Flight Engineer/Second Officers overhead circuit
R breaker, panel CB2, zone 215:

R GROUND SERVICE - AVIONICS - AIR - MON (L5).

R On Flight Engineer/Second Officers aft circuit breaker
R panel, CB3, zone 215:

R CABIN PRESSURE CONT - AUTO - CONT (X9),
R CABIN PRESSURE CONT - AUTO - PWR (X10),
R CABIN PRESSURE CONT - STBY - CONT (X11),
R CABIN PRESSURE CONT - STBY - PWR (X12),
R OUTFLOW VALVE - FWD (X14),
R OUTFLOW VALVE - AFT (X17),
R HOT AIR MANF - IND (W5),
R HOT AIR MANF - TEMP - CONT (W6),
R HOT AIR MANF - ISLN - NO. 2 (W7),
R HOT AIR MANF - ISLN - NO. 3 (W8),
R CARGO TEMP - FWD - MID (W9),
R CARGO TEMP - AFT (W10),
R FLOOR HEAT - CONT (W11),
R FLOOR HEAT - PWR (W12),
R DUCT AREA - OVHT DET - DC (W13),
R DUCT AREA - OVHT DET - AC (W14),
R ECS - AIR TEMP - IND (V1),
R PACK - FLOW - IND (V2),
R TEMP CONT - FLT STA - DC (V3),
R TEMP CONT - FLT STA - AC (V4),
R PACK 1 - AUTO/MAN - DC (V5),
R PACK 1 - AUTO/MAN - AC (V6),
R PACK 2 - AUTO/MAN - DC (V7),
R PACK 2 - AUTO/MAN - AC (V8),
R ZONE CENTER TEMPERATURE CONTROL - MID CAB
R - DC (V11),

ZONE CENTER TEMPERATURE CONTROL - MID CAB - AC (V12),

ZONE CENTER TEMPERATURE CONTROL - AFT CAB - DC (V13),

ZONE CENTER TEMPERATURE CONTROL - AFT CAB - AC (V14),

ZONE CENTER TEMPERATURE CONTROL - GALLEY - DC (V15),

ZONE CENTER TEMPERATURE CONTROL - GALLEY - AC (V16),

PACK 3 - AUTO/MAN - DC (V17)

PACK 3 - AUTO/MAN - AC (V18)

BLEED - AIR - IND (R17)

BLEED AIR IND (R17)

(2) Release fasteners around edge of control panel and slide panel inboard (out of rack) until track limit stops are engaged (Ref. Fig. 401).

R CAUTION: TAG ALL CONNECTORS FOR LOCATION ON PANEL BEFORE DISCONNECTING FROM PANEL.

(3) Tag and disconnect electrical connectors at rear of panel. Install protective caps.

(4) Disconnect static reference pressure line at rear of panel. Install protective caps.

(5) Release lock and quick disconnect on each panel track and remove panel from rack.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Place panel in rack, engage each panel track, and push panel outboard (into rack) until locks and quick

disconnects on all panel tracks are engaged (Ref. Fig. 401).

(3) Remove protective caps and connect static pressure reference line at rear of panel.

(4) Remove protective caps and connect electrical connectors at rear of panel. Remove tags.

(5) Slowly push panel outboard (into rack) until flush with other panels. Engage panel fasteners.

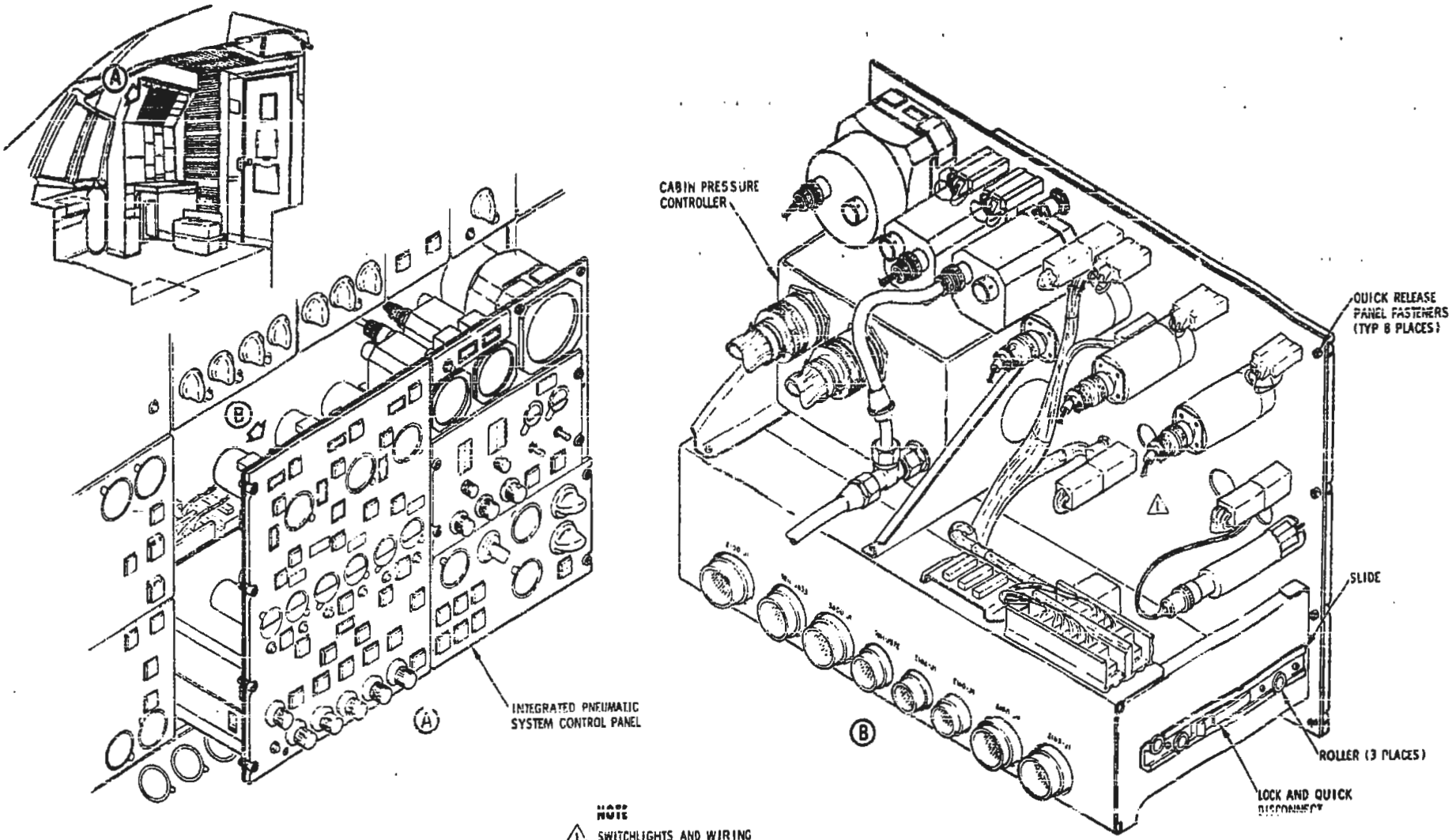
(6) Remove tags and close circuit breakers opened in Step 2A(1).

C. Operational Test

(1) Perform cabin pressure control system adjustment and test (Ref. 21-31-00).

(2) Perform temperature control adjustment (BITE check) and test (Ref. 21-60-00).

(3) Connect high pressure ground air (Ref. 36-13-00) to any one of the three high pressure ground air connections or turn on Engine/APU bleed air. Open both CROSSBLEED valves and aft fuselage ISLN VALVE and verify all three bleed air pressure indicators are indicating same pressure.



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Integrated Pneumatic System (IPS) Control Panel
Removal and Installation
Figure 401

DISTRIBUTION SYSTEM - DESCRIPTION AND OPERATION

1. General

The pneumatic distribution system consists of the following subsystems:

36-11-00	Engine Bleed Air System
36-12-00	Auxiliary Power Unit (APU) Load Compressor Air System
36-13-00	High Pressure Ground Air System
36-14-00	Distribution Manifold System

ENGINE BLEED AIR SYSTEM - DESCRIPTION AND OPERATION

1. General

R The engine bleed air system supplies pressure and temperature-controlled compressed air to all systems using pneumatic pressure. The system is composed of three independent, virtually identical subsystems (one for each engine). The No. 2 engine system differs from those for the No. 1 and No. 3 engines only in component locations (Ref. Fig. 1).

The thrust reverser (Ref. Chapter 78) on each engine receives high-pressure (HP) bleed air through the HP check valve from the engines fourteenth stage.

High pressure deactivation valve is operated by a pip pin which must be manually inserted to prevent cold steam reversers from operating with ground pneumatics applied (78-30-00).

Controls and indicators for the pneumatic system are located in the Flight Engineer/Second Officers (FE/SO) upper panel, zone 215. Those for the engine bleed air system are located near the top of the ENGINE BLEED CONTROL section of the panel (Ref. Fig. 2).

Each of the three engine subsystems of the engine bleed air system is completely independent. The subsystems are individually selectable for use; a malfunction in one subsystem has no direct effect on the other two. Their only common connection is through the manifold system (Ref. 36-14-00).

Each of the three subsystems is selected through the HI PRESS and ENG ISLN VALVE switchlights on the control panel (Ref. Fig. 2). Each HI PRESS switchlight controls one engine HP valve. Each ENG ISLN VALVE switchlight controls one engine isolation valve.

When a switchlight is depressed (latched in), that valve is selected to open. When the switchlight is released (out) the valve is selected to close. When a valve is open, the flowbar in the controlling switchlight is on. When the switchlight is released to close the valve, the OFF legend comes on. When the valve closes, the flowbar goes out to verify closure.

The DUCT OVHT caution lights, to the left of each HI PRESS switchlight, indicates excessive duct temperature in that engine air source. When excessive duct temperature occurs, the applicable DUCT OVHT light comes on and that engine bleed air system automatically shuts down. When the flowbars in the HI

PRESS and ENG ISLN VALVE switchlights go out, valve closure is verified.

A listing and a brief description of the major components in each of the three subsystems follows:

The engine HP valve provides shutoff functions in response to HP valve controller demands. The HP valve is installed in the engine splitter area above the HP check valve.

The HP valve controller provides pneumatic control pressure to the HP valve actuator for shutoff. The valve controller is installed on the engine under the cowl forward of the HP valve.

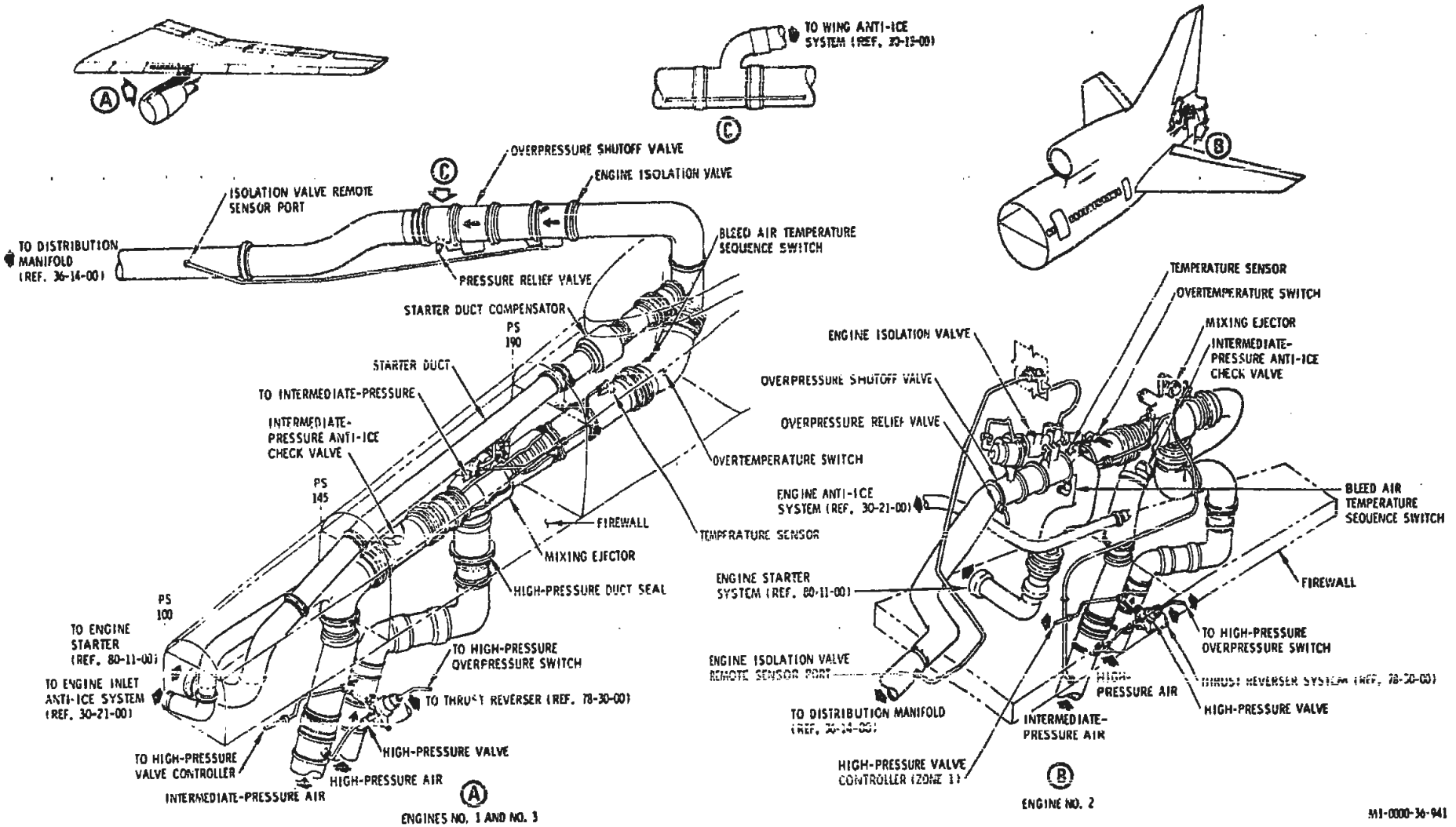
The HP overpressure switch is a pneumatic control that prevents excessive duct pressure in the bleed air ducts by closing the HP valve. The HP overpressure switch is installed in the engine splitter area next to the HP valve.

R The mixing ejector receives both intermediate pressure (IP) and HP bleed air. When IP air pressure is lower than required, the mixing ejector adds needed flow of HP air. The mixing ejector receives temperature control input from the temperature sensor. The ejectors for the No. 1 and No. 3 engines are installed in the pylon; the one for the No. 2 engine is installed in the afterbody above the engine.

The temperature sensor senses mixed air temperature from the mixing ejector and provides an equivalent pneumatic signal to the mixing ejector for temperature control. The sensors for the No. 1 and No. 3 engines are installed in the pylon above the engines; the one for the No. 2 engine is installed in the afterbody above the engine. The temperature sequence switch and the overtemperature switch sense mixed air temperature from the ejector.

The switches are installed near the temperature sensor. If the temperature exceeds 545°F (285°C) the temperature sequence switch closes the engine HP valve until the temperature drops. If the temperature exceeds 570°F (299°C) the overtemperature switch closes the HP and engine isolation valves and turns on the DUCT OVHT and AREA/DUCT OVHT caution lights in the FE/SO upper panel, zone 215, and pilots main instrument panel, zone 210, respectively.

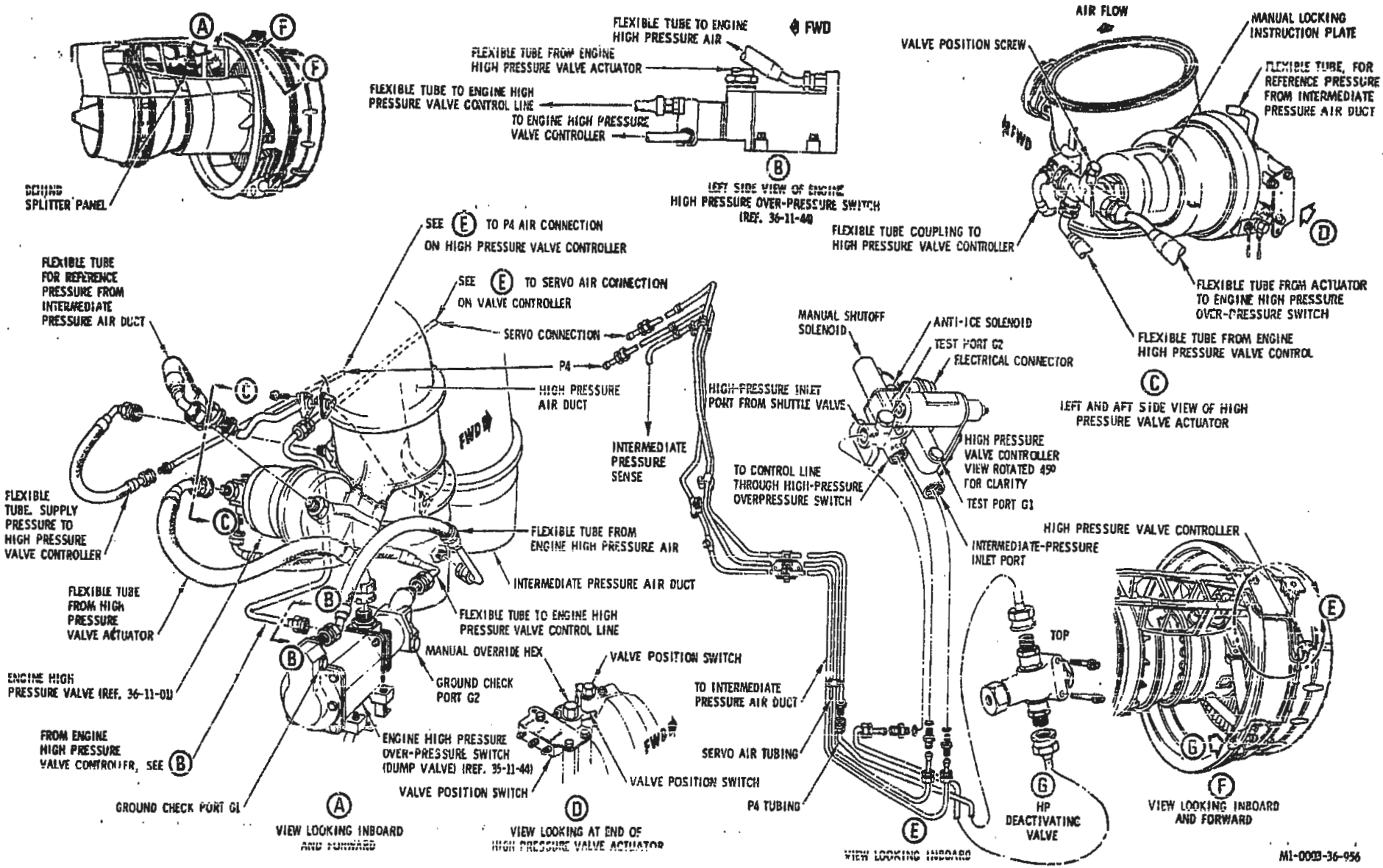
Each engine is provided with an isolation valve. When the isolation valve is open, the engine subsystem is connected, unless closed by the overpressure shutoff valve, to the distribution manifold (Ref. 36-14-00); when closed, the engine subsystem is isolated from the distribution manifold system. The isolation valves for the No. 1 and No. 3



R Engine Bleed Air System Installation
R Figure 1 (Sheet 1)

EFFECTIVITY: ALL

001B


BEHIND SPLITTER PANEL
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE AIR
FWD
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
TO ENGINE HIGH PRESSURE VALVE CONTROLLER
LEFT SIDE VIEW OF ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (REF. 36-11-44)
AIR FLOW
VALVE POSITION SCREW
MANUAL LOCKING INSTRUCTION PLATE
FLEXIBLE TUBE, FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
FLEXIBLE TUBE COUPLING TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM ACTUATOR TO ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE CONTROL
LEFT AND AFT SIDE VIEW OF HIGH PRESSURE VALVE ACTUATOR
SEE E TO P4 AIR CONNECTION ON HIGH PRESSURE VALVE CONTROLLER
SEE E TO SERVO AIR CONNECTION ON VALVE CONTROLLER
SERVO CONNECTION
P4
HIGH PRESSURE AIR DUCT
FLEXIBLE TUBE FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
INTERMEDIATE PRESSURE SENSE
HIGH-PRESSURE INLET PORT FROM SHUTTLE VALVE
MANUAL SHUTOFF SOLENOID
ANTI-ICE SOLENOID
TEST PORT G2
ELECTRICAL CONNECTOR
HIGH PRESSURE VALVE CONTROLLER VIEW ROTATED 45° FOR CLARITY
TEST PORT G1
TO CONTROL LINE THROUGH HIGH-PRESSURE OVERPRESSURE SWITCH
FLEXIBLE TUBE, SUPPLY PRESSURE TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE AIR
INTERMEDIATE PRESSURE AIR DUCT
FLEXIBLE TUBE FROM HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
MANUAL OVERRIDE HEX
VALVE POSITION SWITCH
GROUND CHECK PORT G2
TO INTERMEDIATE PRESSURE AIR DUCT
ENGINE HIGH PRESSURE VALVE (REF. 36-11-01)
FROM ENGINE HIGH PRESSURE VALVE CONTROLLER, SEE B
ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (DUMP VALVE) (REF. 35-11-44)
SERVO AIR TUBING
VALVE POSITION SWITCH
P4 TUBING
GROUND CHECK PORT G1
VIEW LOOKING INBOARD AND FORWARD
VIEW LOOKING AT END OF HIGH PRESSURE VALVE ACTUATOR
VIEW LOOKING INBOARD
HIGH PRESSURE VALVE CONTROLLER
INTERMEDIATE-PRESSURE INLET PORT
TOP
HP DEACTIVATING VALVE
VIEW LOOKING INBOARD AND FORWARD
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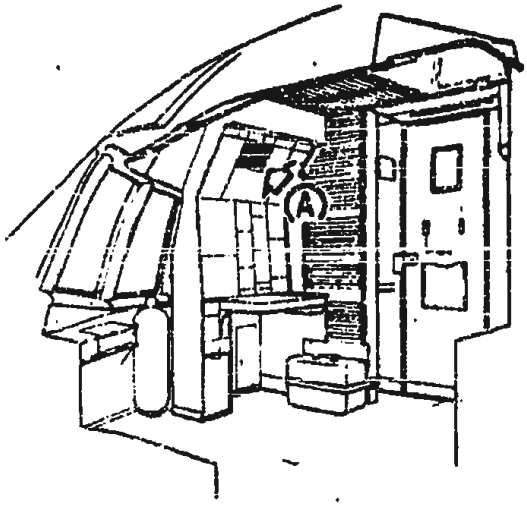
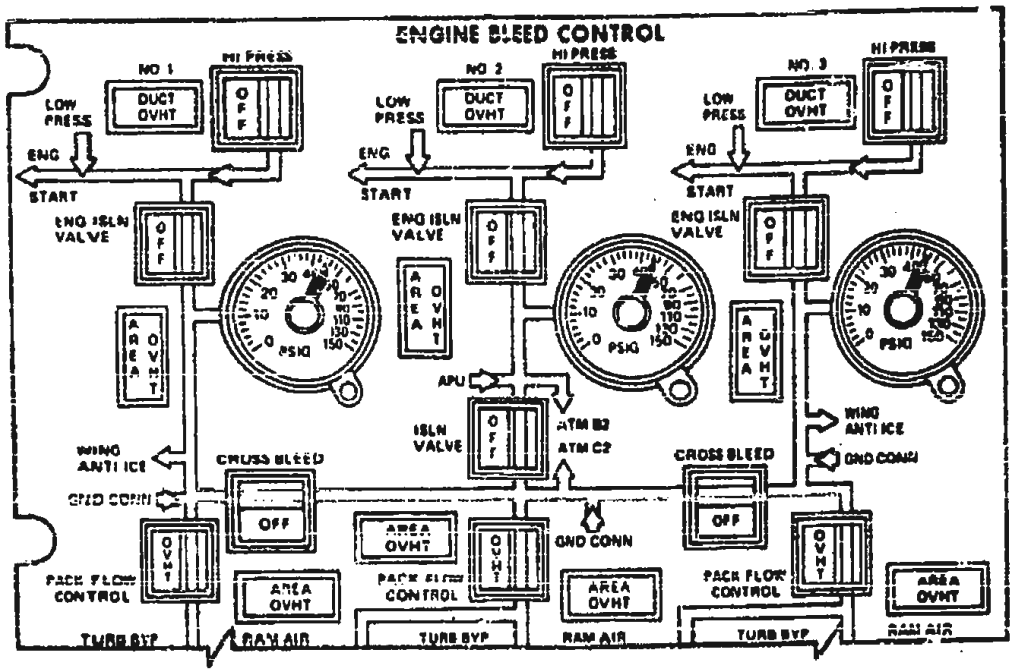
R Engine Bleed Air System Installations
R Figure 1 (Sheet 2)

EFFECTIVITY: ALL

001B





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Engine Bleed Air Control Panel
Figure 2

engines are installed in the wing leading edge inboard of each engine; the one for the No. 2 engine is installed in the afterbody above the engine.

The overpressure shutoff valve is pneumatically controlled. It is located and prevents excessive pressure downstream of the engine isolation valve. The overpressure shutoff valve closes the engine isolation valve which latches closed and turns off the associated flowbar on the ENGINE BLEED CONTROL panel, zone 210.

R The overpressure relief valve opens to relieve excessive bleed air duct pressure overboard. A relief valve is installed just downstream of the overpressure shutoff valve in each engine subsystem.

Within each engine compartment, bleed air is ducted as follows (Ref. Fig. 1):

Between the HP check valve on the engine and the HP valve, HP air is ducted to the thrust reverser (Ref. Chapter 78).

Between the IP check valve and the IP anti-ice check valve, IP air is ducted to the engine inlet anti-ice system (Ref. 30-21-00).

High-pressure air is ducted from the HP valve to the underside of the mixing ejector. In the ejector, the IP air from the IP anti-ice check valve is mixed with the HP air to furnish controlled pressure and temperature air.

Between the mixing ejector and the engine isolation valve, bleed air is ducted to the engine starter (Ref. Chapter 80, Starting).

The three engine bleed air subsystems end with the overpressure shutoff and overpressure relief valves. This point on each subsystem is the beginning of the distribution manifold system (Ref. 36-14-00). The manifold connects the three subsystems together, and the manifold is also connerted to the follcwing systems:

To the wing anti-ice systems (Ref. 30-13-00) in each wing leading edge, just inboard of the No. 1 and No. 3 engine isolation valve.

To a T-connection with the supply air duct from the APU load compressor (Ref. 36-12-00) in the aft fuselage, just aft of the pressure bulkhead.

To the two air turbine motor (ATM) driven hydraulic pumps (Ref. 29-11-00) in the mid-fuselage at the aft end of the hydraulic service center.

To the three pack flow control valves for the air conditioning supply system (Ref. 21-21-00) in the mid-fuselage under the floor of the mid electrical service center.

2. Operation

Each subsystem is individually selectable and controllable through HI PRESS and ENG ISLN VALVE switchlights on the FE/SO upper panel ENGINE BLEED CONTROL panel zone 215, (Ref. Fig. 2).

There are two modes of operation for the engine bleed air system that are common to all three engine subsystems. The normal mode, when anti-ice systems are not in use, or the wing anti-ice mode when selected for use (Ref. 30-13-00).

R There are also two modes of operation for the engine isolation
R valve within each engine bleed air subsystem. Normal mode
R operation is when bleed air is taken from that system. The
R other mode is when reverse flow for engine starting or for
R thrust reverser actuation is required. This mode uses air from
R the distribution manifold.

Since all three engine bleed air subsystem control circuits are the same, only one operational description (for the No. 1 engine system) is provided.

A. High-pressure Valve Control

(1) Normal Mode

When the HI PRESS switchlight on the ENGINE BLEED CONTROL panel (Ref. Fig. 2 thru 4) is released (out), 28V dc is applied to light the OFF legend and to the close solenoid of the HP valve controller The controller closes the HP valve when pneumatic pressure is present in the duct. When the valve is closed, the valve position switch (located on the valve) is closed and a ground is supplied to energize the HP remote relay. When the relay closes, 28V dc is removed from the switchlight flowbar which goes out.

When the HI PRESS switchlight is depressed, 28V dc is removed from the close solenoid of the HP valve controller. The removal of 28V dc closes the poppet valve vent and allows the HP valve to open if there is pressure in the duct. However, if the pressure exceeds

160 psi, the HP overpressure switch closes the HP valve. At the same time the HI PRESS switchlight is depressed, the anti-ice circuit is enabled but not activated.

When the HP valve opens, the valve position switch opens, which deenergizes the HP remote relay. The 28V dc is removed from the mixing ejector anti-ice solenoid (through the deenergized contacts of the time-delay and HP remote relays), and applied to light the flowbar of the HI PRESS switchlight. The deenergized anti-ice solenoid moves the mixing ejector HP nozzle plug into the pressure-regulating and temperature-limiting position.

(2) Anti-ice Mode

When the wing anti-ice system (Ref. 30-13-00) is selected by depressing a system switchlight, 28V dc is applied to the HI PRESS switchlight. The wing anti-ice system is normally only operative in the air. On the ground the system operates only when the TEST switch is depressed and held.

When the HI PRESS switchlight is depressed, 28V dc is sent through the deenergized HP overheat relay contacts to energize the anti-ice remote relay and, through the HP remote relay contacts to energize the 10-second time-delay relay. The anti-ice remote relay applies 28V dc to the time-delay relay contacts.

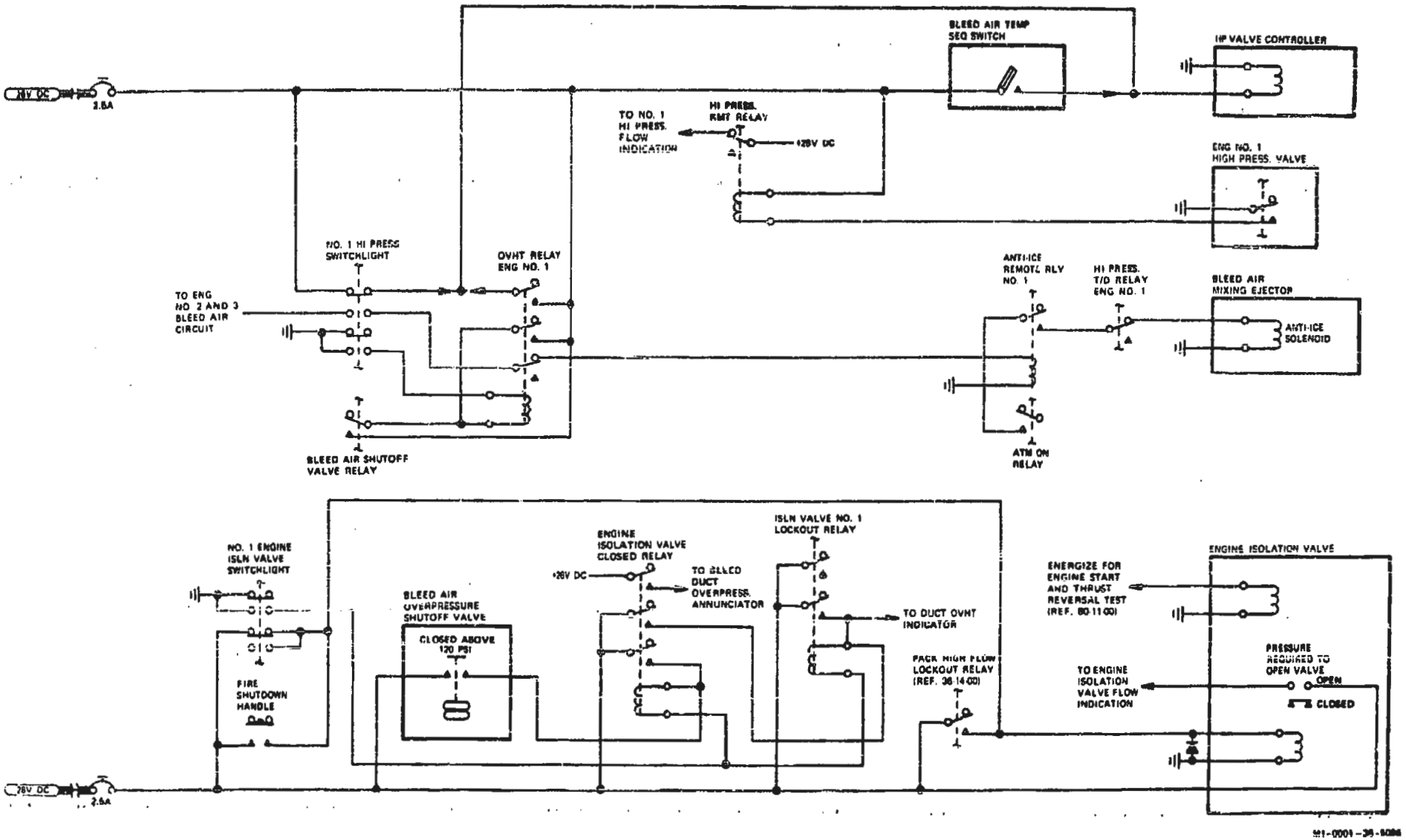
The time-delay relay closes when energized and opens 10 seconds later. During the 10 seconds that the relay is closed, time-delay relay contacts keep the mixing ejector solenoid deenergized which moves the ejector nozzle plug to the pressure-regulation and temperature-limiting position.

At the end of 10 seconds, the time-delay relay automatically drops out. The time-delay relay released, applies 28V dc to the mixing ejector anti-ice solenoid. Thus, the mixing ejector opens to the temperature-regulating position.

B. Engine Isolation Valve Control

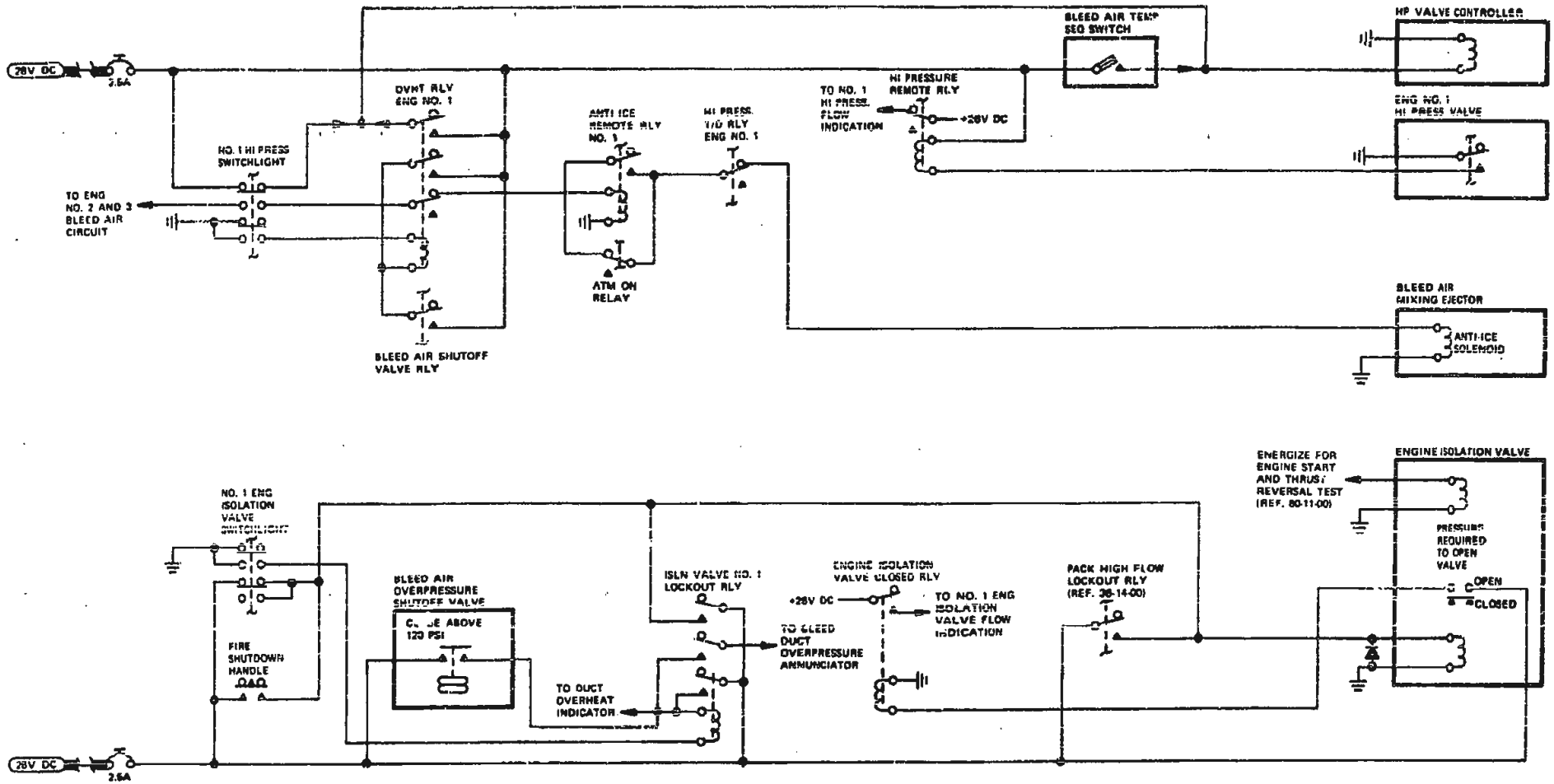
(1) Normal Mode

When the ENG ISLN VALVE switchlight on the ENGINE BLEED CONTROL panel is released, 28V dc is applied to light the off legend and to close the engine isolation valve.


BLEED AIR TEMP SEQ SWITCH
HP VALVE CONTROLLER
TO NO. 1 HI PRESS. FLOW INDICATION
HI PRESS. RMT RELAY
+28V DC
ENG NO. 1 HIGH PRESS. VALVE
NO. 1 HI PRESS SWITCHLIGHT
OVHT RELAY ENG NO. 1
TO ENG NO 2 AND 3 BLEED AIR CIRCUIT
ANTI-ICE REMOTE RLY NO. 1
HI PRESS. T/O RELAY ENG NO. 1
BLEED AIR MIXING EJECTOR
ANTI-ICE SOLENOID
BLEED AIR SHUTOFF VALVE RELAY
ATM ON RELAY
NO. 1 ENGINE ISLN VALVE SWITCHLIGHT
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
ENGINE ISOLATION VALVE CLOSED RELAY
+28V DC
TO BLEED DUCT OVERPRESS. ANNUNCIATOR
ISLN VALVE NO. 1 LOCKOUT RELAY
TO DUCT OVHT INDICATOR
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST (REF. 80-11-00)
ENGINE ISOLATION VALVE
PACK HIGH FLOW LOCKOUT RELAY (REF. 36-14-00)
TO ENGINE ISOLATION VALVE FLOW INDICATION
PRESSURE REQUIRED TO OPEN VALVE
OPEN
CLOSED
FIRE SHUTDOWN HANDLE
28V DC
2.5A

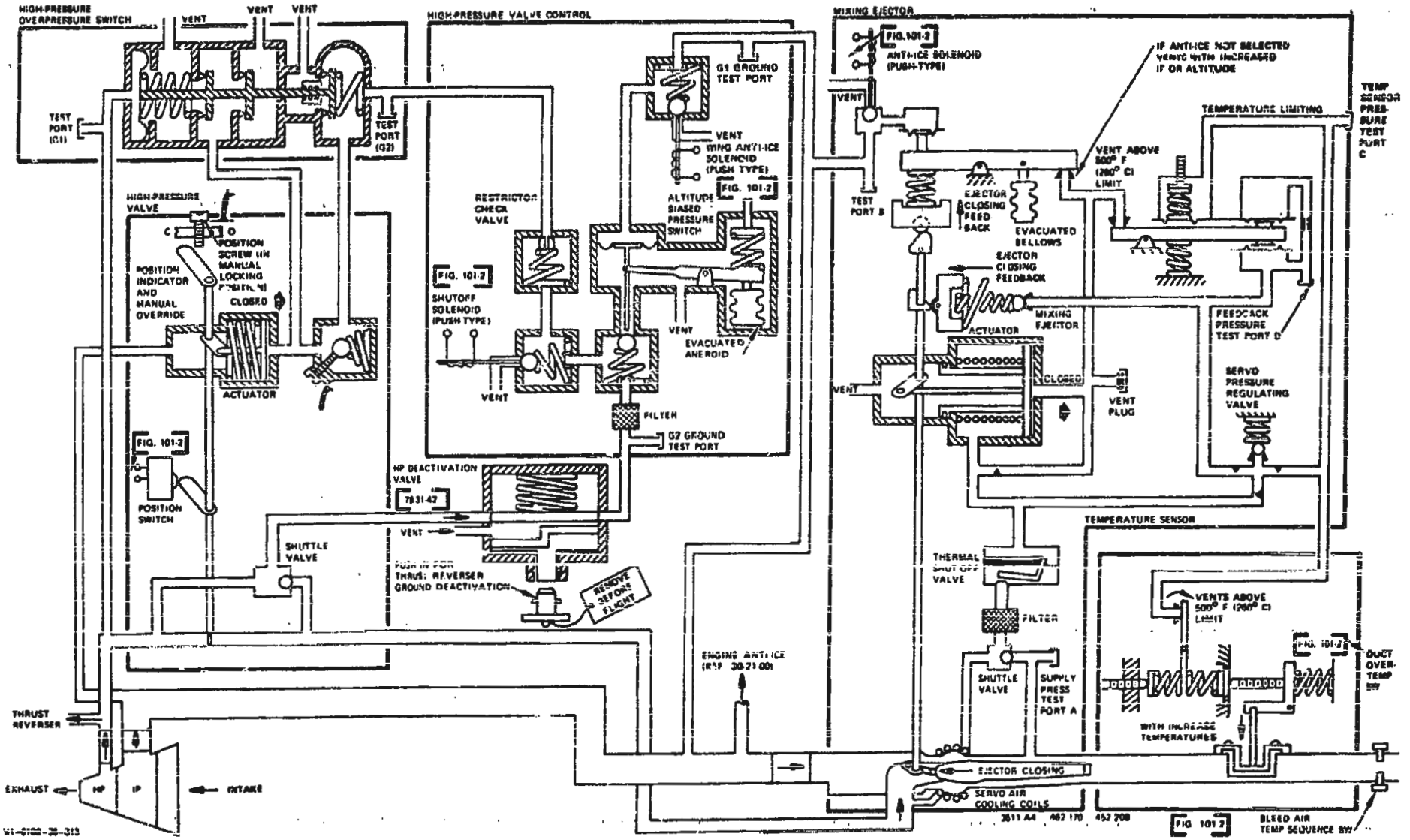
R Typical Engine Bleed Air System Simplified Schematic
R Figure 3

EFFECTIVITY: 001, 003-999

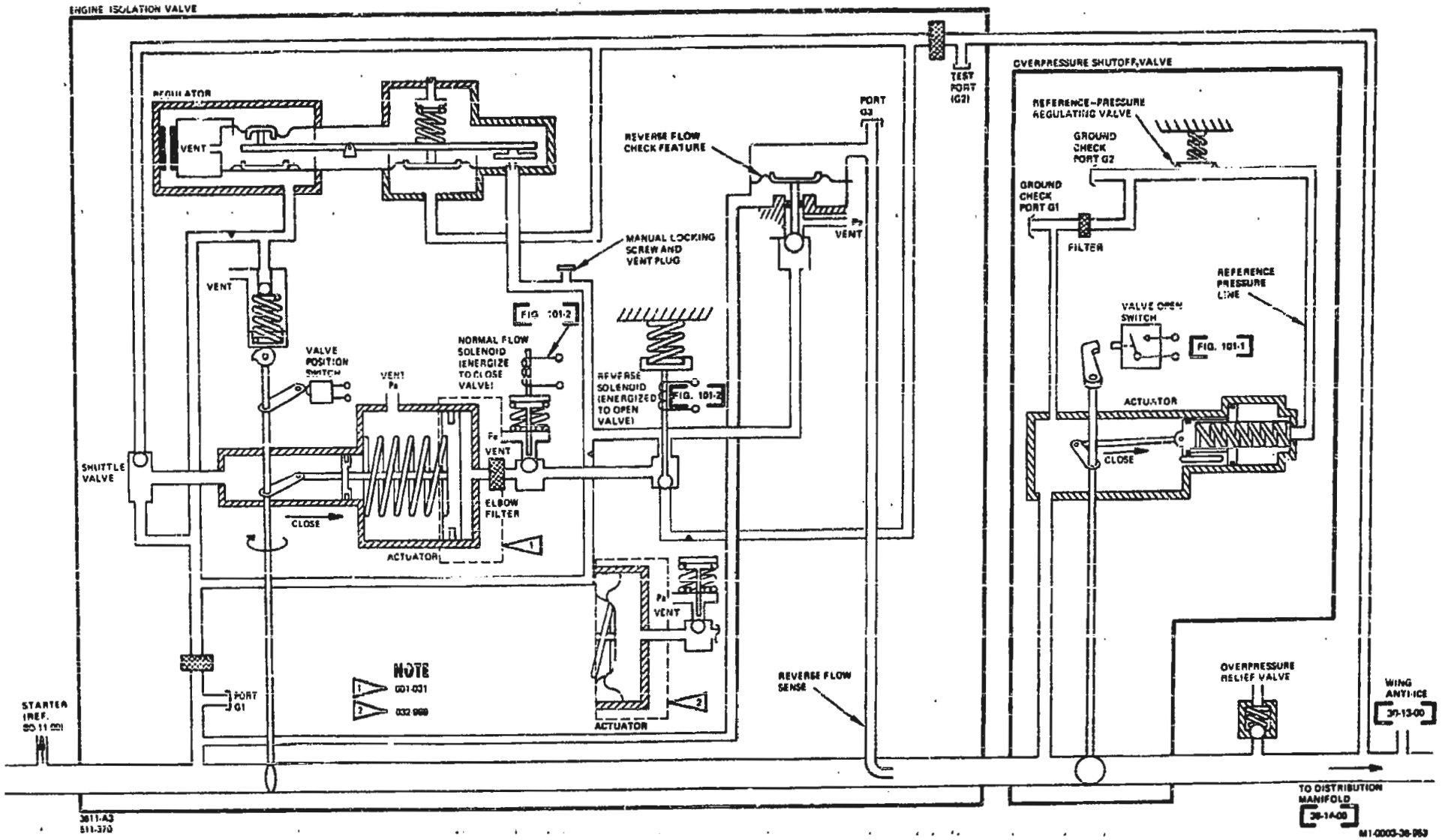

28V DC
2.5A
OVHT RLY ENG NO. 1
NO. 1 HI PRESS SWITCHLIGHT
TO ENG NO. 2 AND 3 BLEED AIR CIRCUIT
BLEED AIR SHUTOFF VALVE RLY
ANTI ICE REMOTE RLY NO. 1
ATM ON RELAY
HI PRESS. V/O RLY ENG NO. 1
TO NO. 1 HI PRESS. FLOW INDICATION
HI PRESSURE REMOTE RLY
+28V DC
BLEED AIR TEMP SEQ SWITCH
HP VALVE CONTROLLER
ENG NO. 1 HI PRESS VALVE
BLEED AIR MIXING EJECTOR
ANTI-ICE SOLENOID
NO. 1 ENG ISOLATION VALVE SWITCHLIGHT
FIRE SHUTDOWN HANDLE
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSE ABOVE 120 PSI
TO DUCT OVERHEAT INDICATOR
ISLN VALVE NO. 1 LOCKOUT RLY
TO BLEED DUCT OVERPRESSURE ANNUNCIATOR
ENGINE ISOLATION VALVE CLOSED RLY
+28V DC
TO NO. 1 ENG ISOLATION VALVE FLOW INDICATION
PACK HIGH FLOW LOCKOUT RLY (REF. 36-14-00)
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST (REF. 80-11-00)
ENGINE ISOLATION VALVE
PRESSURE REQUIRED TO OPEN VALVE
OPEN
CLOSED
28V DC
2.5A

M1-C001-36-8017

R Typical Engine Bleed Air System Simplified Schematic
R Figure 3



Typical Engine Bleed Air Pneumatic Schematic
Figure 4 (Sheet 1)



R Typical Engine Bleed Air Pneumatic Schematic
R Figure 4 (Sheet 2)

R When the valve closes, the switchlight flowbar goes
R out.

When the ENG ISLN VALVE switchlight is depressed 28V dc is removed from the engine isolation valve close solenoid. The valve opens with pressure in the duct and flow direction from the engine. The valve pneumatically regulates the downstream pressure. If the flow direction reverses, the valve closes. When the valve opens, the valve position switch closes and lights the flowbar on ENG ISLN VALVE switchlight.

(2) Engine Starting or Thrust Reverser Testing

The engine isolation valve must be opened for either engine starting or thrust reverser testing. When either the GND START/ASSIST AIR START switchlight (Ref. 80-11-00) on the ENGINE START control panel, or the APU/GND AIR TO REVERSERS switch (Ref. 78-30-00), on the pilots center console are actuated, 28V dc is applied to the reverse flow solenoid. The energized solenoid opens the valve to provide reverse airflow to start the engine or actuate the thrust reverser for testing.

C. Malfunction

If the bleed air temperature exceeds 545°F (285°C), the temperature sequence switch closes, and applies 28V dc to the close solenoid of the HP valve controller. When the temperature drops, the switch opens, and the HP valve is free to re-open automatically. If bleed air temperature overshoots the 545°F (285°C) sequence switch, the duct overtemperature switch provides backup protection. When the temperature exceeds 570°F (299°C) the overtemperature switch closes and applies 28V dc as follows:

To light the DUCT OVHT light on the ENGINE BLEED CONTROL panel.

To light the AREA/DUCT OVHT light on the pilots main instrument panel.

To energize the isolation valve lockout relay.

To energize the HP valve overheat relay.

The relays are grounded through the depressed HI PRESS and ENG ISLN VALVE switchlights. When the relays close, holding contacts hold them closed. Another set of contacts on each relay applies 28V dc to the close solenoid of the HP valve controller and the engine isolation valve. When the valves

close the flowbars in the HI PRESS and ENG ISLN VALVE switchlights go out, but the associated OFF lights do not come on.

Thus, both the engine isolation valve and the HP valve are closed. When the overtemperature is reduced, the switches open. The DUCT OVHT light and the AREA/DUCT OVHT light go out, but the two lockout relays (isolation valve lockout relay and engine overheat relay) remain closed. The valves may be opened again by depressing the HI PRESS and ENG ISLN VALVE switchlights twice.

If the engine anti-ice or other engine hot air ducts leak, the engine area overheat system (Ref. 36-22-00) detects the leak and closes the engine HP valve (Ref. Fig. 4). At the same time either or both of the A or B caution lights on the FE/SO upper panel, zone 215, NACELLE/PYLON OVHT DET TEST panel comes on for the affected engine.

If the wing or fuselage duct pressure exceeds 120 psig steady state or 180 psig transient, the overpressure shutoff valve closes and energizes the engine isolation valve overheat lockout relay. The engine isolation valve closes.

On aircraft 001-014 without SB 36-009, the BLEED DUCT OVERPRESS legend on the FE/SO upper panel, zone 215, annunciator panel comes on momentarily, whenever the overpressure shutoff valve closes, to indicate that one of the overpressure shutoff valves was activated.

On aircraft 015-999 and 001-014 with SB 36-009, the BLEED DUCT OVERPRESS legend on the FE/SO panel, zone 215, annunciator panel comes on and stays on after the engine ISLN valve closes, whenever the overpressure shutoff valve closes, to indicate that one of the overpressure shutoff valves was activated. The engine isolation valve is also closed by the pack high flow lockout relay (Ref. 36-14-00) when pack flow is excessive.

3. Engine High-pressure Valve

A. Description and Operation

The engine HP valve is a shutoff valve with a separate controller and overpressure switch. The valve is a flange mounted 6.0 inch diameter, butterfly type valve (Ref. Fig. 5). It is pneumatically controlled by the remotely located HP valve controller. In event that the duct pressure exceeds 160 psi, the HP overpressure switch vents the control pressures. The valve controller is electrically

controlled from the ENGINE BLEED CONTROL panel at the FE/SO upper panel, zone 215.

The valve also includes a position switch that is used to indicate when the valve is closed. The same valve is used in all three engine bleed systems.

The valve is located in the splitter area, zone 3, of each engine between the thrust reverser duct and the mixing ejector inlet duct. Pneumatic control lines run through the HP overpressure switch to the controller located under the right-side nose cowl which is a cooler part of the engine.

4. High-pressure Valve Controller and Engine High-pressure Overpressure Switch

A. Description

R The HP valve controller (Ref. Fig. 6) provides a servo control for the HP valve. It consists of an anti-ice solenoid poppet valve, a shutoff solenoid poppet valve, and an altitude biased pressure switch. A filter is also included in the supply line from the HP valve. The control line is fed through the engine HP overpressure switch to prevent excessive pressure in the bleed air system ducting.

The altitude biased pressure switch consists of an evacuated bellows, a diaphragm piston lever assembly, and a spring-loaded ball poppet valve.

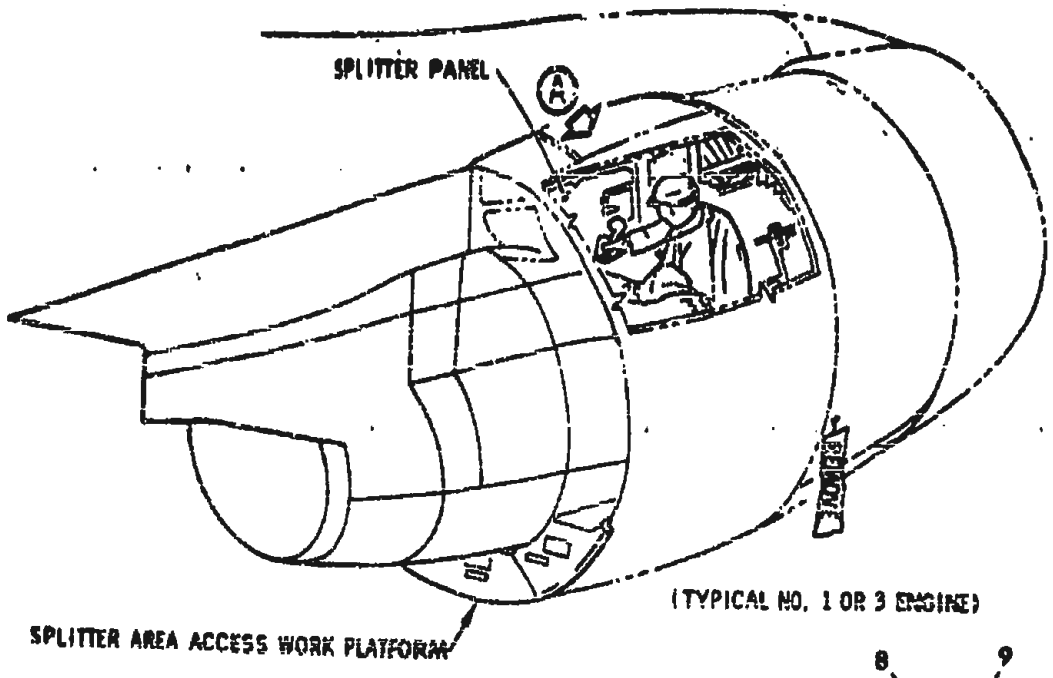
There are two pneumatic pressure sources used. One is from either side of the HP valve through a shuttle valve. The other is from the IP air.

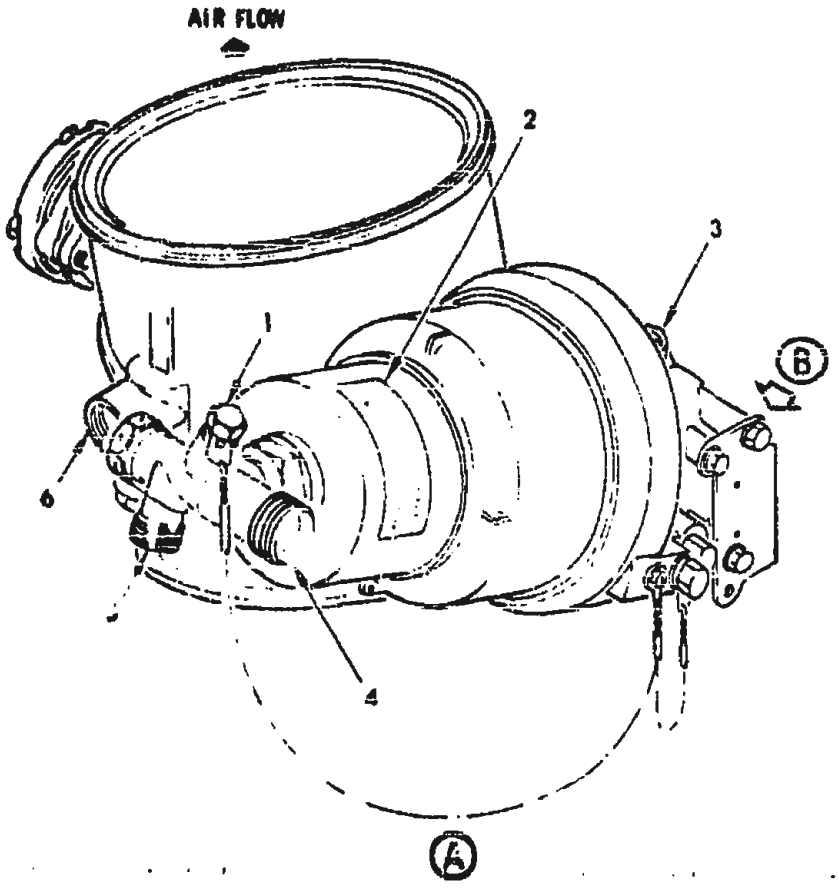
The engine HP overpressure switch (Ref. Fig. 4 and 7) is a fast-acting non-latching pressure vent. The switch is located next to the HP valve in the splitter, zone 3, and rapidly closes the HP valve when the HP ducting exceeds 160 psig. This limits the duct pressure downstream to 180 psig.

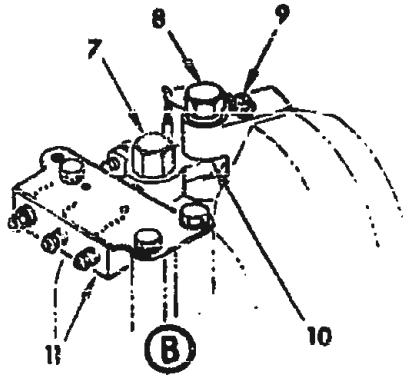
B. Operation

The HP valve and controller work together to supply HP air to the engine mixing ejector and engine anti-ice systems. When the system is operating normally, no anti-ice selected, HP from upstream of the HP valve (Ref. Fig. 7) actuates the supply shuttle valve to supply air to the valve controller.

In the controller, the supply air goes through the closed altitude biased poppet valve. It then goes through the closed shutoff poppet valve to the HP overpressure switch.







1 VALVE POSITION SCREW (IN NORMAL OPERATING POSITION)
2 MANUAL LOCKING INSTRUCTION PLATE
3 REFERENCE PRESSURE FROM ENGINE INTERMEDIATE-PRESSURE AIR
4 ACTUATOR VENT TO HP OVERPRESSURE SWITCH
5 HIGH-PRESSURE CONTROL LINE THRU HP OVERPRESSURE SWITCH
6 SUPPLY PRESSURE TO HP VALVE CONTROLLER
7 MANUAL OVERRIDE HEX
8 VALVE POSITION SCREW (IN MANUAL LOCKING POSITION)
9 POSITION SCREW CHAIN HOLD
10 VALVE POSITION INDICATOR
11 VALVE POSITION SWITCH

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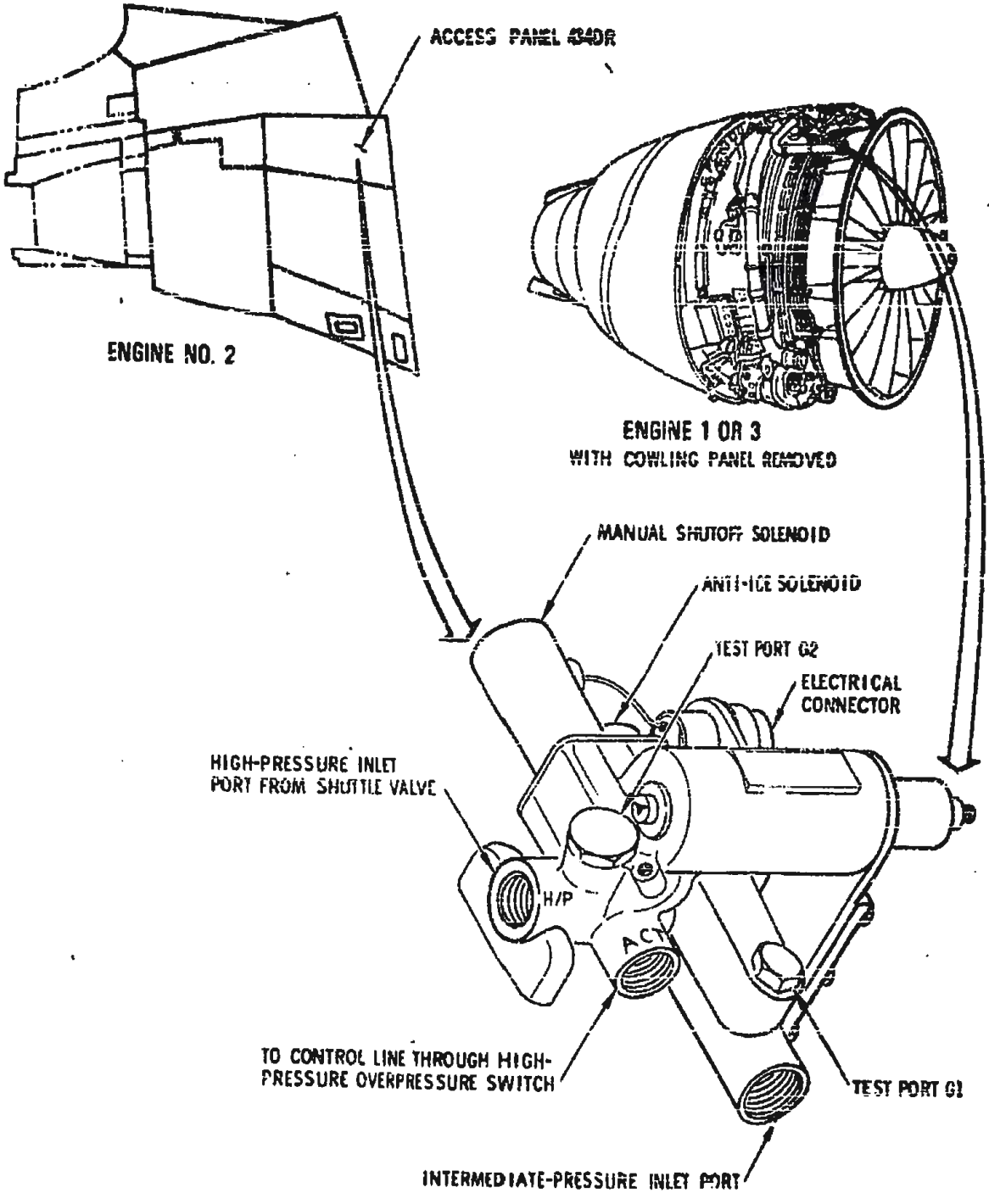
Engine High-pressure Valve
Figure 5



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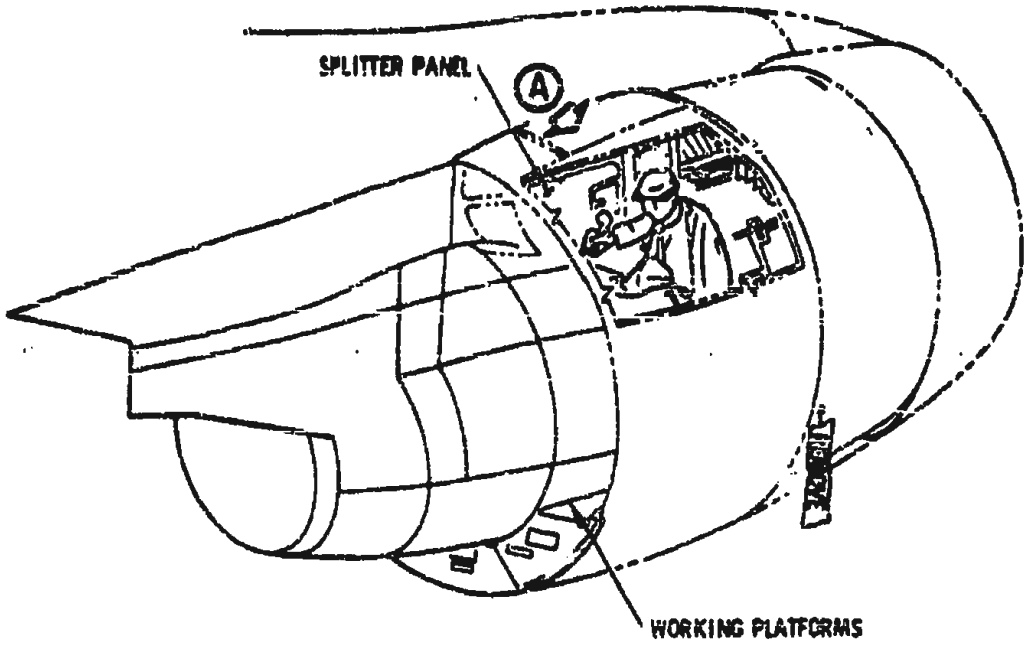
R
R

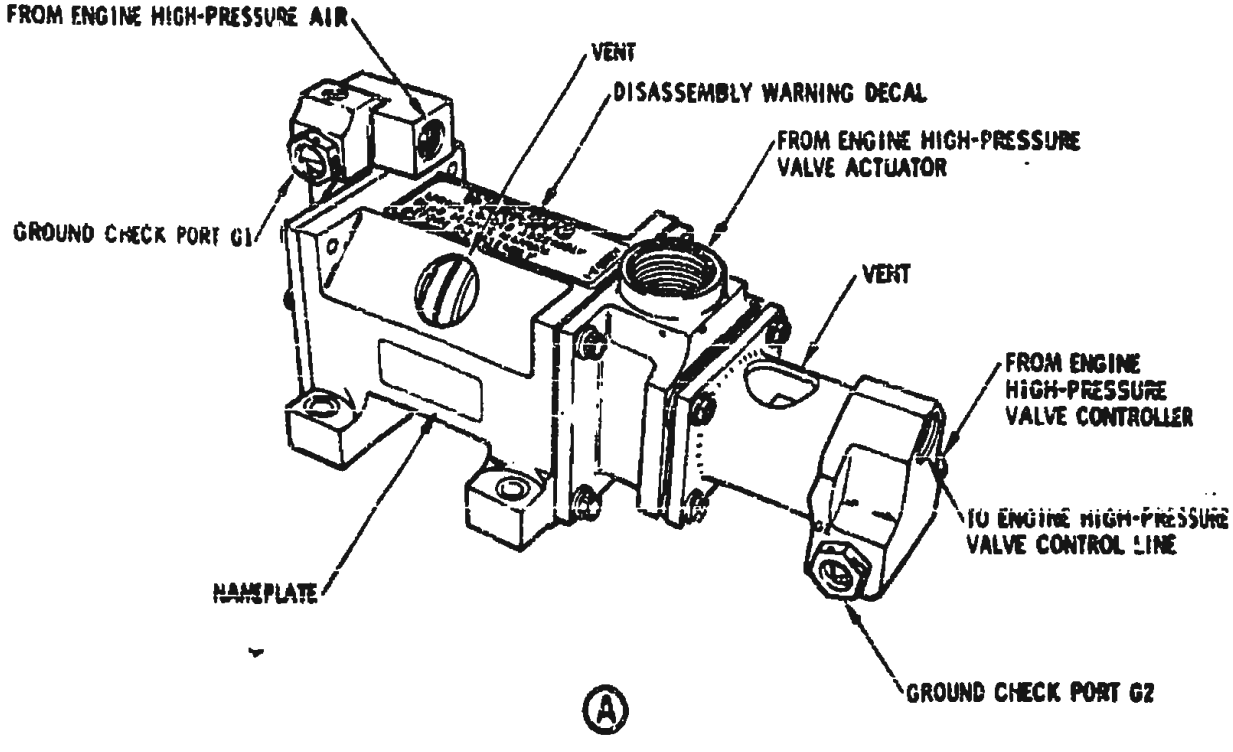
High-pressure Valve Controller
Figure 6

EFFECTIVITY: ALL

001B



TYPICAL - ENGINE NO. 1 OR 3



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Engine High-pressure Overpressure Switch
Figure 7

If the duct pressure is below 150 psig, the HP air is fed through the pneumatic open poppet valve, to the HP valve actuator to open the HP valve.

When the HI PRESS switchlight on the ENGINE BLEED CONTROL, zone 215, is depressed (Ref. Fig. 2), 28V dc is removed from the shutoff solenoid and the poppet valve closes. The closed valve allows the altitude biased pressure switch to control the HP valve.

When the altitude pressure decreases, below the value set by the spring and evacuated bellows, the expanding bellows moves the diaphragm piston lever to open the poppet valve. This vents the HP control line and closes the HP valve since HP air is not required at cruising altitudes.

If the HP air exceeds 160 psig, the HP overpressure switch senses this pressure and is pneumatically operated to vent the HP control lines and to close the HP valve.

If wing anti-ice is selected (Ref. 30-13-00), 28V dc is applied to the HP valve controller anti-ice solenoid. The energized solenoid opens the anti-ice poppet valve and vents the IP to the altitude biased pressure switch. Thus, the
R altitude biased pressure switch is overridden, its poppet valve is closed, and the HP valve is fully open unless closed by the HP overpressure switch as described in the previous paragraph.

When the HI PRESS switchlight on the ENGINE BLEED CONTROL panel is released, 28V dc is applied to the controller shutoff solenoid. The shutoff poppet valve opens, vents the control line, and closes the HP valve.

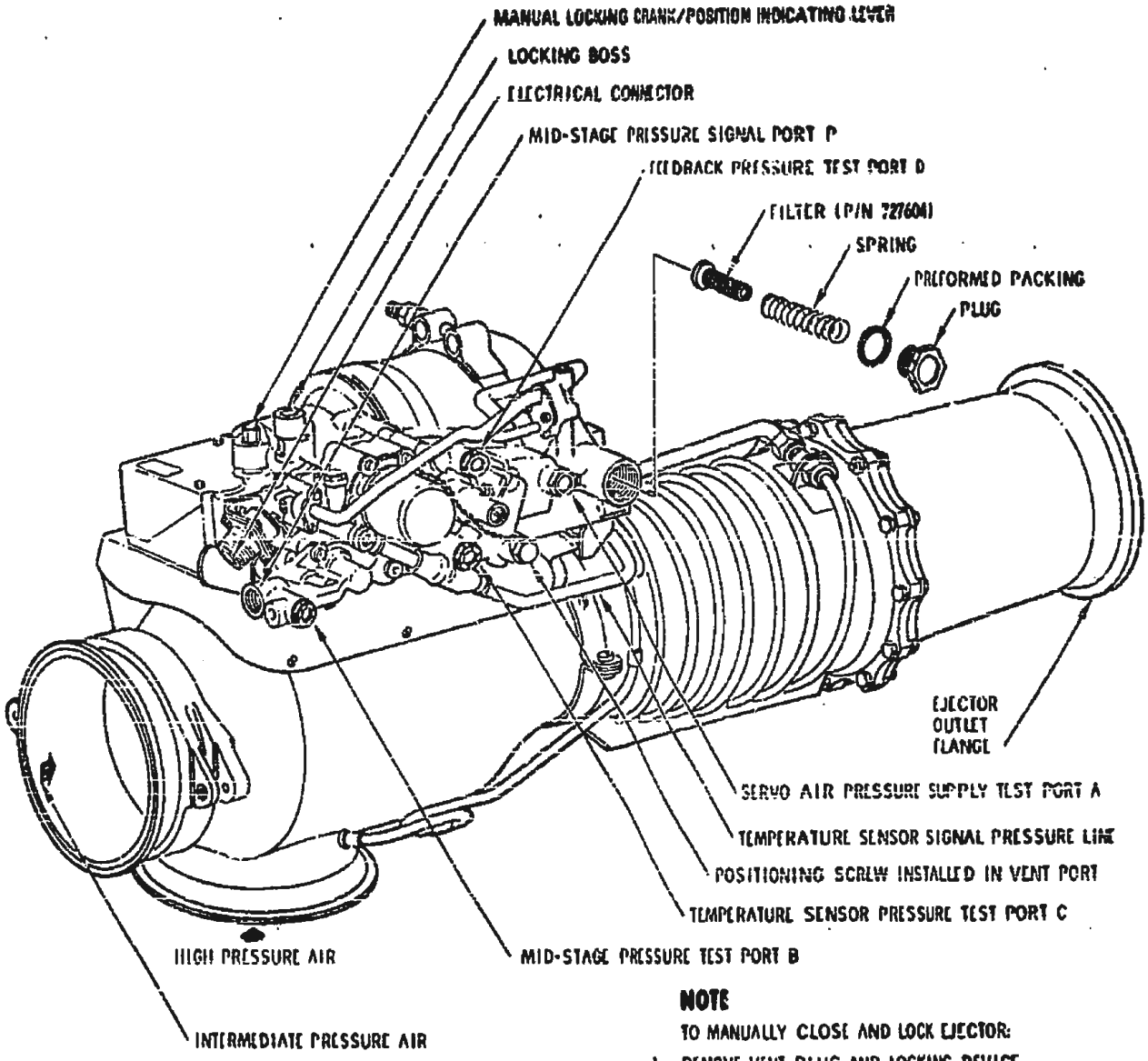
5. Engine Mixing Ejector

A. Description

The engine mixing ejector (Ref. Fig. 4 and 8) is a pneumatic mixing jet pump. It is used to mix engine HP air with engine IP air to maintain the following conditions:

When wing anti-ice is not selected, mixing ejector air is regulated inversely to IP and scheduled for altitude, and limited in temperature. When wing anti-ice is selected, mixing ejector air is temperature regulated.

The maximum air temperature is limited to 500 to 525°F (260 to 274°C) if anti-ice is not selected. When anti-ice is selected the temperature is regulated between 500 and 525°F (260 and 274°C).



NOTE

TO MANUALLY CLOSE AND LOCK EJECTOR:

1. REMOVE VENT PLUG AND LOCKING DEVICE TO VENT ACTUATOR SERVO PRESSURE
2. USE 1/2 INCH WRENCH ON MANUAL OVERRIDE TO ROTATE POSITION INDICATOR AND MANUAL LOCK LEVER TO "LOCK CLOSED" POSITION
3. INSERT VENT PLUG AND MANUAL LOCKING DEVICE INTO LOCKING BOSS THROUGH LEVER AND TIGHTEN

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R
R

Engine Mixing Ejector
Figure 8

Whenever the HP valve is closed, the mixing ejector plug is in the open position. This allows maximum IP airflow with the least pressure drop.

The mixing ejectors for No. 1 and 3 engines are located in the pylon just above the engine hoop plate. The mixing ejector for No. 2 engine is located in the structure above the engine.

The mixing ejector consists of a jet pump with a movable plug. Intermediate-pressure is connected to the throat while HP is connected to the jet nozzle. An ejector plug actuator, anti-ice solenoid, supply shuttle valve and filters, a servo supply pressure regulator, an area scheduler pressure regulator, and a temperature limiter and regulator are parts of the mixing ejector.

The temperature sensor further downstream is also required for operation but is not part of the mixing ejector.

B. Operation

There are two modes of operation (Ref. Fig. 4) for the mixing ejector. The first mode is with area scheduling, that is, without wing anti-ice selected. In this mode the ejector plug is controlled to vary the HP nozzle area against Intermediate Pressure (IP) and ambient altitude pressure in accordance with a preset schedule. The second mode is with wing anti-ice selected. In this mode, area scheduling is overridden by the anti-ice solenoid poppet valve while the temperature is regulated instead of limited.

R The maximum air temperature is limited to 500 to 525°F (260
R to 274°C) if anti-ice is not selected. When anti-ice is selected the temperature is regulated between 500 and 525°F (260 and 274°C).

(1) Area Scheduling Mode

Both IP and altitude pressures are applied to the area schedule lever arm. Together they move the arm to change the leakage from the control line vent. The vent allows the actuator cylinder to open or close the mixing ejector plug. As the plug moves, the actuator position is fed back, through the area schedule cam, to the area schedule lever arm. The cam force is applied to the lever arm to counteract the pressure changes and to provide area scheduling. Thus, the mixing ejector plug is moved in accordance with a preset schedule to vary the nozzle area with respect to IP and altitude pressures.

R During area scheduling the air temperature should
R remain below 500 to 525°F (260 to 274°C).

If the temperature increases to this value, the bleed air temperature sensor downstream of the mixing ejector begins to open its control line vent and reduces the pressure in the control line to the temperature control chamber. The chamber piston, in turn, moves the temperature regulator lever arm away from the actuator control line vent. This venting overrides the area scheduling function and the actuator begins to respond to temperature limiting. Actuator movement is fed back through a poppet valve, to the opposed temperature control chambers. One chamber responds immediately to oppose any change. The other chamber slowly responds to cancel the effect of the first chamber. Thus, the mixed air from the mixing ejector is temperature limited.

(2) Anti-ice Mode

When wing anti-ice is selected, 28V dc is applied to the anti-ice solenoid. The solenoid valve closes and disables the area scheduler. Thus, the actuator and plug will respond to the temperature sensor, as described in Paragraph 5B(1), and regulate the mixed
R air temperature.

R The temperature is regulated between 500° and 525°F
R (260 and 274°C).

(3) Mixing Ejector Control Air

The mixing ejector pneumatic control source comes from a tap on the HP line. The hot air is cooled in heat transfer coils around the mixing ejector. From the coils it goes through a shuttle valve, a filter, and a thermal shutoff valve to supply air to the actuator cylinder and the servo pressure regulator. The pressure regulator supplies the temperature control system with operating pressure. The area scheduler operates with the unregulated pressure taken from the engine case. When reverse air flow is necessary the reverse flow shifts the shuttle valve to supply servo
R power.

6. Temperature Sensor

A. Description and Operation

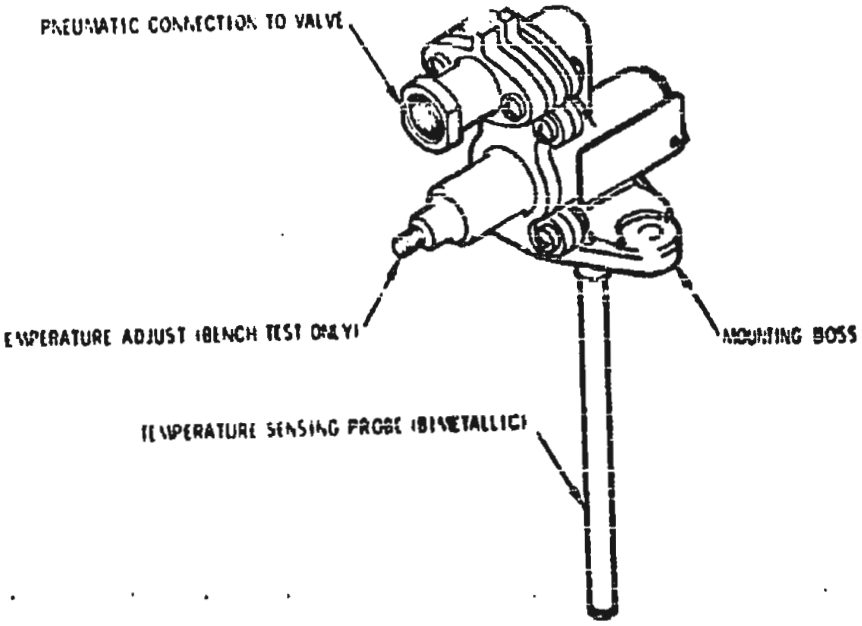
The temperature sensor is a pneumatic servo air pressure control containing a bimetallic temperature sensing element, a motion multiplying crank, and a pressure regulator (Ref. Fig. 4 and 9).

Three temperature sensors are used, one with each of the three mixing ejectors in the three engine bleed air systems. The function of each temperature sensor is to limit the
R mixed air discharge temperature from that mixing ejector.

R The maximum air temperature is limited to 500 to 525°F (260 to 274°C) if anti-ice is not selected. When anti-ice is selected the temperature is regulated between 500 and 525°F
R (260 and 274°C).

The temperature sensors are installed immediately downstream of each mixing ejector, with the bimetallic temperature sensing element protruding into the duct, well immersed in the mixed air flow. The sensor is mounted to the duct using a two-bolt boss. A single servo air line connects the sensor to the mixing ejector (Ref. Fig. 9).

The mixing ejector and temperature sensor for each wing engine bleed air system are installed in each engine pylon, above the engine (zones 452 and 462), and for the center engine, are in the area above that engine (zone 471).



Temperature Sensor
Figure 9

The mixing ejector actuator pressure, taken from the engine HP bleed air inlet port of the mixing ejector, is modulated to control in-flow of HP bleed air to mix with IP bleed air. Increased actuator pressure provides increased flow of the hotter HP bleed air.

The temperature sensor functions to limit or control the mixed IP and HP bleed air temperature through control of ejector actuator pressure.

When ejector discharge temperature is below the limit, the temperature sensor orifice is closed and ejector actuator pressure is controlled by the area scheduler in the mixing ejector (Ref. Fig. 4). The area scheduler controls HP air flow in inverse proportion to IP air, adding HP air as IP decreases.

If the area scheduler admits enough hot HP bleed air so that mixed air temperature approaches the limit, the temperature sensor comes into use. As this temperature is approached, the bimetallic temperature sensor and motion multiplier begin to open the sensor pressure regulator bleed orifice. The orifice is opened as much as is necessary to limit ejector actuator pressure and thereby hot HP air flow, to that which keeps ejector discharge temperature at the limit.

When wing anti-ice is selected, the area scheduler in the mixing ejector is disabled, and the temperature sensor assumes a temperature control, rather than limiting, function. Under this condition, the temperature sensor controls mixing ejector actuator pressure to provide enough hot HP bleed air to regulate mixing ejector discharge air temperature.

7. Temperature Sequence and Overtemperature Switches

R A. Description and Operation

R The temperature sequence switch is set to close if the bleed air temperature exceeds 545°F (285°C) and the overtemperature switch is set to close if the bleed air
R temperature exceeds 570°F (299°C).

The switches are located in the bleed air duct downstream of each engine mixing ejector (Ref. Fig. 1). The switches are wired in parallel. If the temperature sequence switch senses an overheat condition, the HP valve closes until the temperature drops. If the overtemperature switch senses an overheat the HP valve and the engine isolation valve are closed by lockout relays, and the DUCT OVHT and AREA/DUCT OVERHEAT caution lights are turned on in the flight station.

8. Engine Isolation Valve

A. Description

The engine isolation valve (Ref. Fig. 4 and 10) is a 6-inch diameter butterfly type pneumatically actuated pressure-regulating valve. It is used to provide isolation of one engine bleed air system from the pneumatic manifold system (Ref. 36-14-00). The valve controls consist of an actuator, regulator and valve overcontrol units, a valve open switch, reverse flow detector, a close solenoid poppet valve, and reverse flow solenoid poppet valve.

The No. 1 and 3 engine isolation valves are mounted in the wing over the pylons. The No. 2 engine isolation valve is located in the structure above the engine.

B. Operation

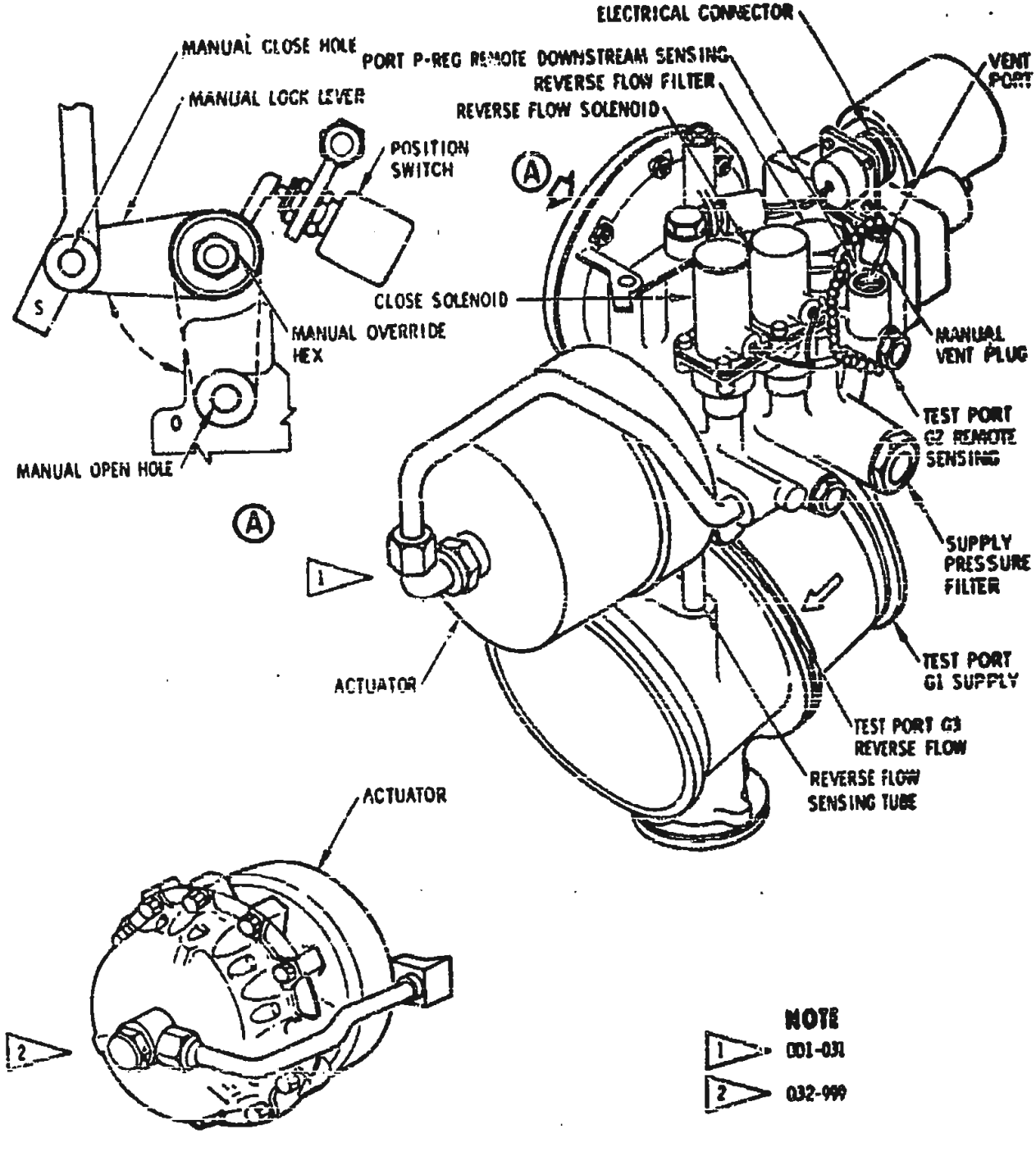
The engine isolation valve limits the bleed air duct pressure to 40 psig. As the pressure varies it is sensed downstream of the valve and causes a piston to move the regulating lever arm. This changes the leakage from the regulating vent valve.

The change in pressure goes through the closed reverse flow solenoid poppet valve and the closed shutoff solenoid poppet valve to the actuator cylinder. The actuator then turns the butterfly to reduce the sensed pressure change. The changes are damped by the overcontrol damper. Overcontrol is prevented by the cam actuated, spring loaded, feedback valve and damper assembly.

When air flow reverses, pressure from the remote sensing port goes through the shuttle valve to the actuator. The actuator then closes slowly. If the reverse flow is greater than 225 pounds of air per minute, ram pressure is picked up by the reverse sensing probe. The ram pressure moves the reverse flow check piston and poppet valve to vent the actuator control line and closes the valve rapidly.

In order to start an engine it is necessary to supply air from downstream. This would normally close the valve. When the GROUND START/ASSIST AIR START switchlight on the ENGINE START control panel, on the pilots overheat control panel, zone 210, is depressed, 28V dc is applied to the reverse flow solenoid. This transfers the actuator control line from the regulator to the remote sensor. Pressure from the sensor drives the actuator to the open position.

When the ENG ISLN VALVE switchlight on the ENGINE BLEED CONTROL panel (Ref. Fig. 2) is released 28V dc is applied to



Engine Isolation Valve
Figure 10

the close solenoid. The solenoid shaft pushes in the shutoff poppet and vents the actuator control line to close the valve. The valve closing function has priority over all other signals.

R For ground test of the thrust reverser from an air source
R other than its respective engine, the thrust reverser ground
R test switch on pilots center console is held closed. 28V dc
R is applied to the reverse flow solenoid on the engine
R isolation valve which allows reverse air flow from an
R alternate pneumatic source to the engine for thrust reverser
R operation.

9. Overpressure Shutoff Valve

A. Description and Operation

The overpressure shutoff valve is pneumatically controlled and prevents excessive pressure downstream of the engine isolation valve (Ref. Fig. 4 and 11). The overpressure shutoff valve closes the engine isolation valve when it detects an overpressure. The engine isolation latches closed and the BLEED AIR OVERPRESS light is turned on at the Flight Engineers/Second Officers upper panel, zone 215, annunciator panel. The overpressure shutoff valve opens after the engine isolation valve is closed and the duct pressure downstream is reduced.

10. Overpressure Relief Valve

A. Description and Operation

R The overpressure relief valve prevents valve seal leakage pressure from exceeding 135 to 145 psig. It is located just downstream from each of the overpressure shutoff valves (Ref. Fig. 1). The relief valve consists of a stainless steel body, a piston, and a spring with a titanium crush
R washer used for bench calibration of relief pressure (Ref. 36-11-22 Inspection and Check).

11. Starter Duct Compensator

A. Description

The starter duct compensator is a telescopic ducting assembly using sliding seals and the differential area principle in such a way that it decreases in length (telescopes) with internal air pressure. Its function is to maintain tension upon a length of pneumatic ducting to

compensate for changes in duct length due to temperature changes (Ref. Fig. 12).

Two starter duct compensators are used, one in each wing engine pylon, within the pylon main beam structure forward of the wing. Forming part of the duct, the compensator maintains tension upon the starter air ducting between the engine bleed air duct, where it passes up into the wing leading edge, and the point where the starter duct passes through the bottom of the pylon into the powerplant area (zone 452 in left pylon and zone 462 in right pylon).

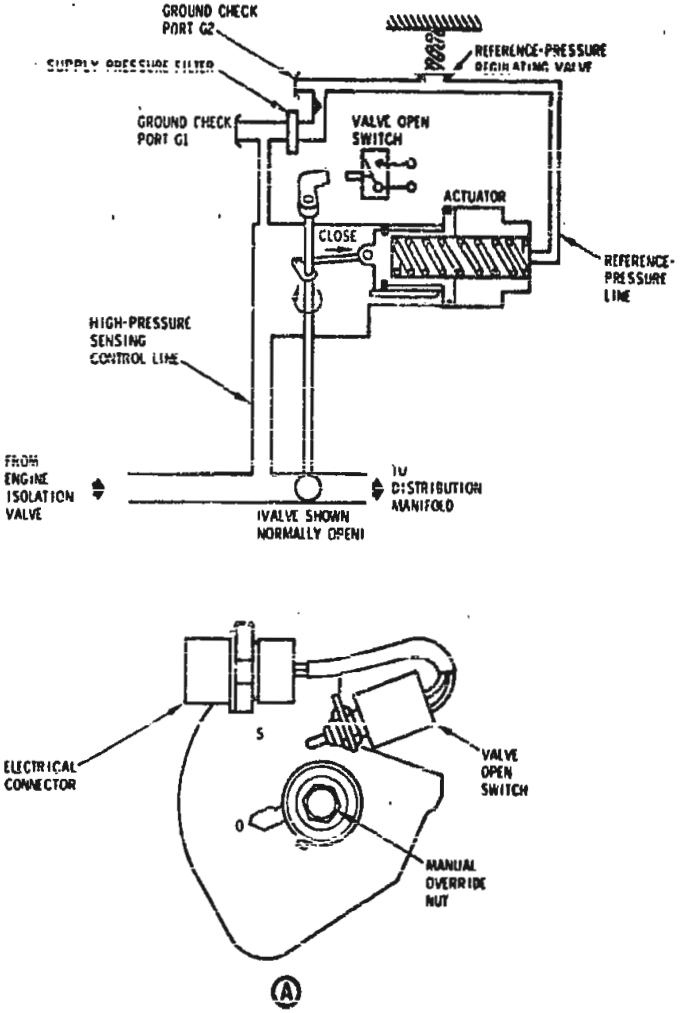
Each compensator is flange mounted at both ends, using double T-bolt V-band couplings with E-type seals between the compensator and the ducts. One mounting flange is male, and the other female, to prevent incorrect installation. The compensator consists of two (coaxial) tubular inconel sections with sliding seals and bearings and a rubberized fabric dust boot. The mounting flanges mate with the 4.5 inch diameter starter duct, and the maximum shell diameter is 6.75 inches. The unit installed length, at normal temperatures, is 15.9 inches. At very low duct temperatures it will extend to 17.4 inches, and at very high duct temperatures it will telescope to as short as 14.4 inches.

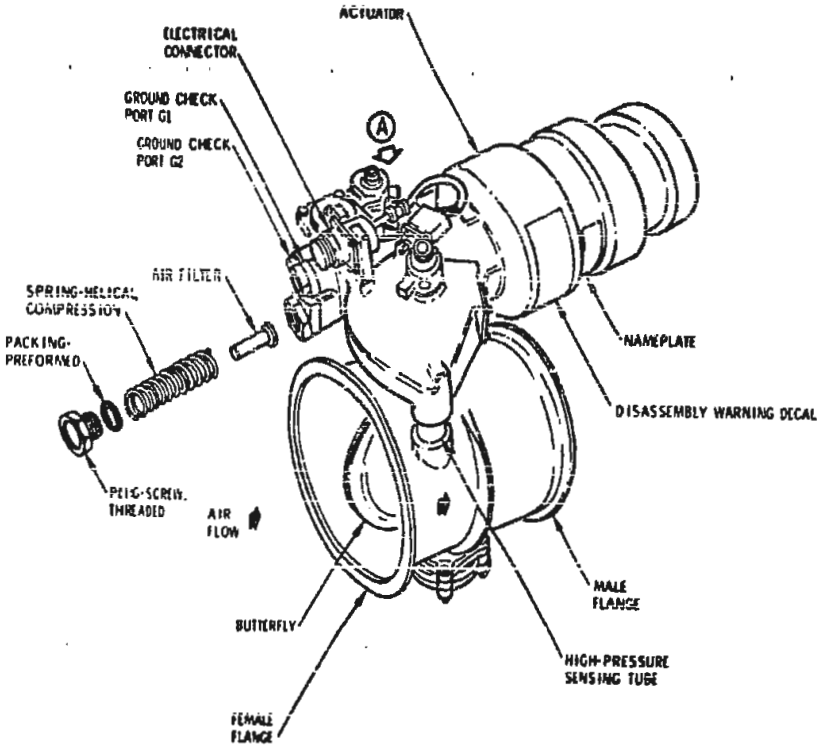
The female (largest diameter) section of the compensator consists of two concentric tubular sections joined at the mounting flange by bolts around the larger diameter perimeter, for disassembly. The inner tube, with the mounting flange, is approximately twice as long as the outer. A sliding seal and bearing are on the inside of the outer tube, at the end opposite the mounting flange.

The male section is a straight tube with a retainer fitting on the end, inside the female section with two seals and a bearing.

The sliding seal and bearing inside the female section slide on the outer surface of the male section. The larger diameter seal on the male section slides on the inside surface of the large diameter tube of the female section and the smaller diameter seal and bearing on the male section slide on the outer surface of the small diameter tube of the female section.

The area between the inner and outer tubes of the female section near the mounting flange is vented to atmospheric pressure. The area between the sliding seals is exposed to duct pressure. The effective outer diameter of the seals on the male section is considerably larger than the inner diameter of the seal on the end of the female section, giving a differential in surface areas bearing duct air

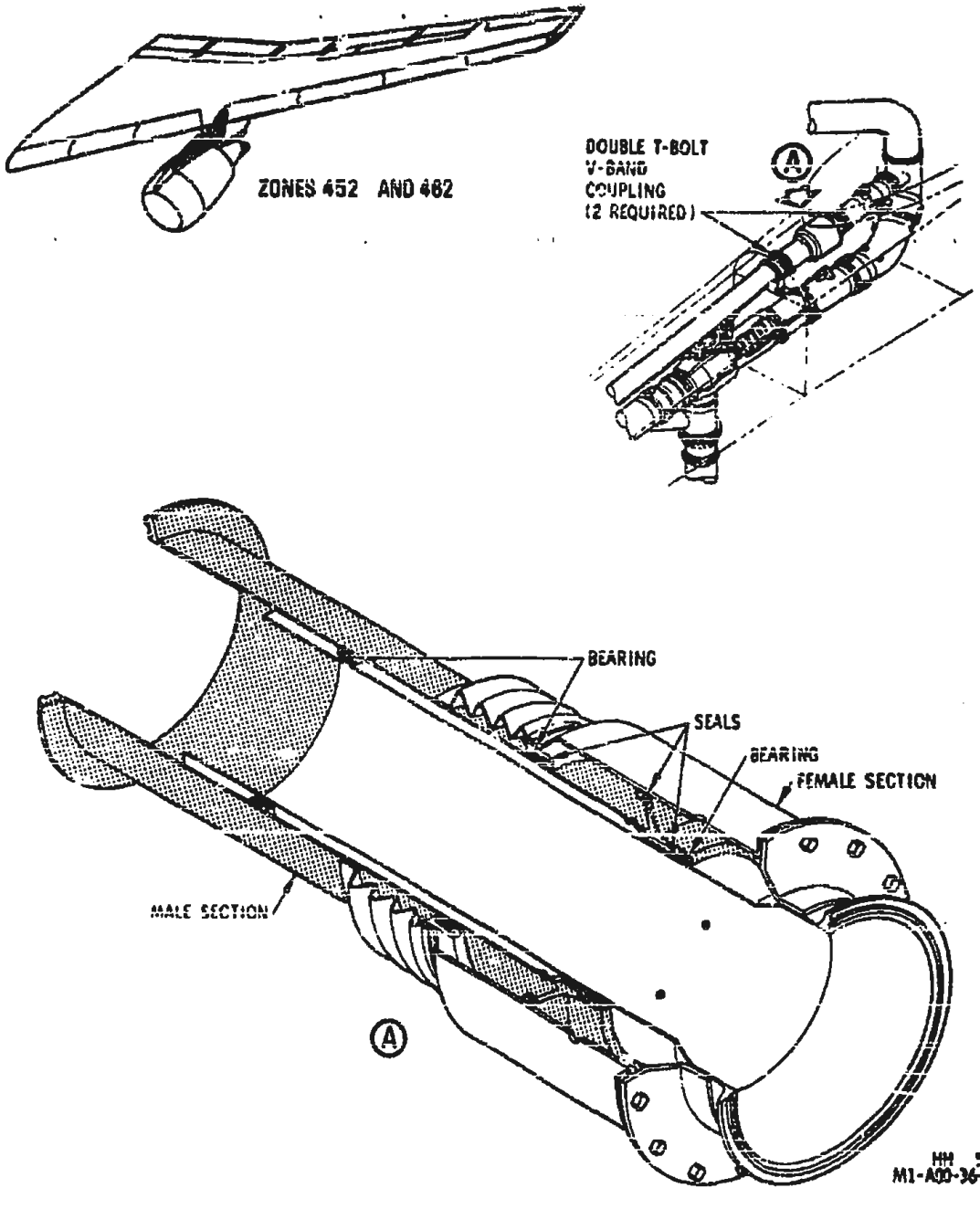




Overpressure Shutoff Valve
Figure 11

EFFECTIVITY: ALL

0018 RR



Starter Duct Compensator
Figure 12

pressure. A third bearing, mounted inside the male section tube, provides support for the free end of the long tube (inner) of the female section.

The dust boot attaches to both the male and female sections to protect the sliding surface on the outside of the male and female sections at the mid point of the compensator.

B. Operation

When the duct compensator is installed, and the duct pressurized, air pressure between the two seals on the inside end of the male section and the seal in the end of the female section tries to force these seals apart (Ref. Fig. 12). The result is that the compensator shortens (telescopes) to apply tension to the starter ducting between the engine bleed air duct and the point where the starter duct passes through the bottom of the pylon. Duct support bracketing between these points provides for movement of the ducting as necessary to allow the duct compensator to uniformly tension the full length of ducting.

12. HP Deactivation Valve

The HP deactivation valve (Ref. 78-31-42) is used during ground maintenance only to prevent operation of the HP valve while maintenance procedures are being performed in the cold stream area.

ENGINE BLEED AIR SYSTEM - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting Engine Bleed Air System faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Engine Bleed Air System. It gives the area and access of each component and its respective removal and installation reference.

Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

R Table 101 is a list of all fault isolation data in this section of the manual.

Engine Bleed Air System Fault Isolation Data
Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Engine Bleed Air Pneumatic Schematic
104	Engine (1, 2, 3) DUCT OVHT Light On
105	FE/SO BLEED DUCT OVERPRESS Light On
106	ENG ISLN VALVE Flowbar Out, Switchlight Depressed
107	ENG ISLN VALVE Switchlight Released, Flowbar Out
108	HI PRESS Flowbar Out, Switchlight Depressed, Engine at Idle
109	HI PRESS Switchlight Released, Flowbar On
110	ENG ISLN VALVE Or HIGH PRESS Switchlight Released, OFF Light Out
111	Thrust Reverser Does Not Operate During Ground Check
112	Engine Bleed Air Pressure Problems
113	Typical Engine Bleed Air System
SCHEM 1	Engine No. 1 Bleed Air Electrical Schematic
SCHEM 2	Engine No. 2 Bleed Air Electrical Schematic
SCHEM 3	Engine No. 3 Bleed Air Electrical Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOX – INDICATOR LIGHT CONTROL:			
ILCB CARD 1A6 (NO. 1)	1	FESC, RT SIDE/112AB	33-17-04
ILCB CARD 1A8 (NO. 2)	1	FESC, RT SIDE/112AB	33-17-04
ILCB CARD 1A13 (NO. 1, 3)	1	FESC, RT SIDE/112AB	33-17-04
ILCB CARD 1A15 (NO. 1, 2)	1	FESC, RT SIDE/112AB	33-17-04
ILCB CARD 1A20 (NO. 1, 2, 3)	1	FESC, RT SIDE/112AB	33-17-04
ILCB CARD 1A22 (NO. 1, 2, 3)	1	FESC, RT SIDE/112AB	33-17-04
CIRCUIT BREAKERS:			
ECS – IND – LT (2121-CB5)	1	FLT STA/CB3 (G12)	•
ENGINE BLEED CONTROL – ENG ISLN VALVES			
– ENG 1 (3611-CB1)	1	FLT STA/CB1 (G10)	•
– ENG 2 (3611-CB2)	1	FLT STA/CB1 (G11)	•
– ENG 3 (3611-CB3)	1	FLT STA/CB1 (G12)	•
ENGINE BLEED CONTROL – HI PRESS VALVES			
– ENG 1 (3611-CB4)	1	FLT STA/CB1 (G13)	•
– ENG 2 (3611-CB5)	1	FLT STA/CB1 (G14)	•
– ENG 3 (3511-CB6)	1	FLT STA/CB1 (G15)	•
ENGINE START CONT			
– ENG 1 (8011-CB13)	1	FLT STA/CB1 (E13)	•
– ENG 2 (8011-CB14)	1	FLT STA/CB1 (E14)	•
– ENG 3 (8011-CB15)	1	FLT STA/CB1 (E15)	•
PILOTS IND LT TEST – 2 (3317-CB2)	1	FLT STA/CB2 (H9)	•
THRUST REVERSE			
– ENG 1 (7831-CB1)	1	FLT STA/CB1 (H16)	•
– ENG 2 (7831-CB2)	1	FLT STA/CB1 (H17)	•
– ENG 3 (7831-CB3)	1	FLT STA/CB1 (H18)	•
COMPENSATOR – DUCT, STARTER	2	PYLON/452CT, 462CT	36-11-27
EJECTOR – MIXING ENG 1, 3	2	PYLON/452AT, 462AT, 452BT, 462BT	36-11-08
EJECTOR – MIXING ENG 2	1	CTR ENG SUPPORT STRUCT/ 471OL, 471CR	
INDICATOR LIGHTS			
NO. 1 DUCT OVHT (3611-DS7)	1	FLT STA, FE/SO UPPER PNL/P11	•
NO. 2 DUCT OVHT (3611-DS8)	1	FLT STA, FE/SO UPPER PNL/P11	•
NO. 3 DUCT OVHT (3611-DS9)	1	FLT STA, FE/SO UPPER PNL/P11	•
BLEED DUCT OVERPRESS (3611-DS12)	1	FLT STA, FE/SO UPPER PNL/P11	•
AREA/DUCT OVERHEAT (3317-DS13)	1	FLT STA, PILOTS CTR INST PNL/P2	•

*SEE WM EQUIPMENT LIST

M1-0000-36-0071

R
R Component Location Index
Figure 101 (Sheet 1)

R EFFECTIVITY: ALL

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COMPONENT	QTY	AREA/ACCESS	REFERENCE
RELAYS:			
ATM ON (3611-K22)	1	MESC, AFT/192K, 137AZ	•
ANTI-ICE - RMT NO. 1 (3611-K8)	1	MESC, AFT/192K, 137AZ	•
ANTI-ICE - RMT NO. 2 (3611-K10)	1	MESC, AFT/192K, 137AZ	•
ANTI-ICE - RMT NO. 3 (3611-K12)	1	MESC, AFT/192K, 137AZ	•
ENG NO. 1 - ISLN V CLOSED (3611-K19)	1	MESC, AFT/192K, 137AZ	•
ENG NO. 2 - ISLN V CLOSED (3611-K21)	1	MESC, AFT/192K, 137AZ	•
ENG NO. 3 - ISLN V CLOSED (3611-K22)	1	MESC, AFT/192K, 137AZ	•
GND START - ENG NO. 1 (8011-K1)	1	MESC, AFT/192K, 137AZ	•
GND START - ENG NO. 2 (8011-K2)	1	MESC, AFT/192K, 137AZ	•
GND START - ENG NO. 3 (8011-K3)	1	MESC, AFT/192K, 137AZ	•
HP RMT SW - ENG NO. 1 (3611-K14)	1	MESC, AFT/192K, 137AZ	•
HP RMT SW - ENG NO. 2 (3611-K16)	1	MESC, AFT/192K, 137AZ	•
HP RMT SW - ENG NO. 3 (3611-K18)	1	MESC, AFT/192K, 137AZ	•
HP TIME DELAY - ENG NO. 1 (3611-K13)	1	MESC, AFT/192K, 137AZ	•
HP TIME DELAY - ENG NO. 2 (3611-K15)	1	MESC, AFT/192K, 137AZ	•
HP TIME DELAY - ENG NO. 3 (3611-K17)	1	MESC, AFT/192K, 137AZ	•
ISLN V NO. 1 - LOCKOUT (3611-K3)	1	MESC, AFT/192K, 137AZ	•
ISLN V NO. 2 - LOCKOUT (3611-K1)	1	MESC, AFT/192K, 137AZ	•
ISLN V NO. 3 - LOCKOUT (3611-K2)	1	MESC, AFT/192K, 137AZ	•
OVHT - RELAY ENG NO. 1 (3611-K4)	1	FESC, BELOW FWD ELECT RACK/112AB	•
OVHT - RELAY ENG NO. 2 (3611-K5)	1	FESC, BELOW FWD ELECT RACK/112AB	•
OVHT - RELAY ENG NO. 3 (3611-K6)	1	FESC, BELOW FWD ELECT RACK/112AB	•
PACK 1 HIGH-FLOW LOCKOUT (3611-K26)	1	MESC, AFT/192K, 137AZ	•
PACK 2 HIGH-FLOW LOCKOUT (3611-K27)	1	MESC, AFT/192K, 137AZ	•
PACK 3 HIGH-FLOW LOCKOUT (3611-K28)	1	MESC, AFT/192K, 137AZ	•
SHUT OFF - ENG NO. 1 (3622-K1)	1	MESC, AFT/192K, 137AZ	•
SHUT OFF - ENG NO. 2 (3622-K2)	1	MESC, AFT/192K, 137AZ	•
SHUT OFF - ENG NO. 3 (3622-K3)	1	MESC, AFT/192K, 137AZ	•
START CONT - ENG NO. 1 (7712-K4)	1	MESC, AFT/192K, 137AZ	•
START CONT - ENG NO. 2 (7712-K5)	1	MESC, AFT/192K, 137AZ	•
START CONT - ENG NO. 3 (7712-K6)	1	MESC, AFT/192K, 137AZ	•
SENSOR - BLEED AIR TEMPERATURE (ENG 1, 3)	2	PYLON/452CT, 452CT	36-11-11
SENSOR - BLEED AIR TEMPERATURE (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-11
SWITCHES:			
APU/GND AIR REVERSER (ENG 1, 7831-S1) ENG 2, 7831-S2) (ENG 3, 7831-S3)	1	FLT STA, PILOTS LOWER REAR CTR CONSOLE/P18	•
BLEED AIR OVERTEMPERATURE, ENG 1 (3611-S6)	1	PYLON/452CT, 462CT	36-11-14
BLEED AIR OVERTEMPERATURE, ENG 2 (3611-S1)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-14
BLEED AIR OVERTEMPERATURE, ENG 3 (3611-S5)	1	PYLON/452CT, 462CT	36-11-14

*SEE WM EQUIPMENT LIST

M1-0000-38-5074

R R Component Location Index
Figure 101 (Sheet 2)

R R EFFECTIVITY: 001-023

001B

COMPONENT	QTY	AREA/ACCESS	REFERENCE
RELAYS			
ATM ON (3611-K22)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ANTI-ICE – RMT NO. 1 (3611-K8)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ANTI-ICE – RMT NO. 2 (3611-K10)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ANTI-ICE – RMT NO. 3 (3611-K12)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ENG NO. 1 – OVER PRESSURE (3611-K19)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
ENG NO. 2 – OVER PRESSURE (3611-K20)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
ENG NO. 3 – OVER PRESSURE (3611-K21)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
GND START – ENG NO. 1 (3611-K1)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
GND START – ENG NO. 2 (3611-K2)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
GND START – ENG NO. 3 (3611-K3)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP RMT SW – ENG NO. 1 (3611-K14)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP RMT SW – ENG NO. 2 (3611-K16)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP RMT SW – ENG NO. 3 (3611-K18)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP TIME DELAY – ENG NO. 1 (3611-K13)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP TIME DELAY – ENG NO. 2 (3611-K15)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
HP TIME DELAY – ENG NO. 3 (3611-K17)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ISLN V NO. 1 – LOCKOUT (3611-K3)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ISLN V NO. 2 – LOCKOUT (3611-K1)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
ISLN V NO. 3 – LOCKOUT (3611-K2)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
OVHT – RELAY ENG NO. 1 (3611-K4)	1	FESC, BELOW FWD ELECT RACK/112AB	•
OVHT – RELAY ENG NO. 2 (3611-K5)	1	FESC, BELOW FWD ELECT RACK/112AB	•
OVHT – RELAY ENG NO. 3 (3611-K6)	1	FESC, BELOW FWD ELECT RACK/112AB	•

*SEE WM EQUIPMENT LIST

M1-0000-36-6075

R R Component Location Index
Figure 101 (Sheet 2)

R RR EFFECTIVITY: 024-999

001B

COMPONENT	QTY	AREA/ACCESS	REFERENCE
SWITCHES (CONT.)			
BLEED AIR TEMPERATURE SEQUENCE (ENG 1, 3611-S3) (ENG 3, 3611-S2)	2	PYLON/482CT, 482CT	36-11-53
BLEED AIR TEMPERATURE SEQUENCE (ENG 2, 3611-S4)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-52
HIGH PRESSURE OVERPRESSURE	3	ENG SPLITTER/418BR, 428BR, 438BR	36-11-44
SWITCHLIGHTS:			
GND START/ASSIST AIR START			
– VALVE OPEN-1 (8011-DS4)	1	FLT STA, PILOTS OVHD PNL/P5	*
– VALVE OPEN-2 (8011-DS3)	1	FLT STA, PILOTS OVHD PNL/P5	*
– VALVE OPEN-3 (8011-DS2)	1	FLT STA, PILOTS OVHD PNL/P5	*
GND START – RELEASE – PUSH (8011-DS1)	1	FLT STA, PILOTS OVHD PNL/P5	*
NO. 1 – ENG ISLN VALVE (3611-DS1)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
NO. 2 – ENG ISLN VALVE (3611-DS2)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
NO. 3 – ENG ISLN VALVE (3611-DS3)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
NO. 1 – HI PRESS (3611-DS4)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
NO. 2 – HI PRESS (3611-DS5)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
NO. 3 – HI PRESS (3611-DS6)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	*
VALVES:			
BLEED AIR OVERPRESSURE RELIEF (ENG 1, 3)	2	WING LEADING EDGE/511LB, 611LB	36-11-22
BLEED AIR OVERPRESSURE RELIEF (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AR	36-11-22
ENG NO. 1 ISOLATION (3611-A3)	1	WING LEADING EDGE/511LB, 611LB	36-11-18
ENG NO. 2 ISOLATION (3611-A1)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-18
ENG NO. 3 ISOLATION (3611-A2)	1	WING LEADING EDGE/511LB, 611LB	36-11-18
HIGH PRESSURE DEACTIVATION (THRUST REVERSER)	3	ACCESSORY SECTION/ ENG 1 & 3: 414A, 424A ENG 2: 434CR	78-31-42

*SEE WM EQUIPMENT LIST

M1-0000-36-5078

R R Component Location Index
Figure 101 (Sheet 3)

R R 0018 EFFECTIVITY: 001-023

COMPONENT	QTY	AREA/ACCESS	REFERENCE
RELAYS (CONT.)			
PACK 1 HIGH-FLOW LOCKOUT (3611-K25)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
PACK 2 HIGH-FLOW LOCKOUT (3611-K27)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
PACK 3 HIGH-FLOW LOCKOUT (3611-K28)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
SHUT OFF – ENG NO. 1 (3622-K1)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
SHUT OFF – ENG NO. 2 (3622-K2)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
SHUT OFF – ENG NO. 3 (3622-K3)	1	MESC, AFT BLKHD, RELAY PNL NO. 1/192K, 137AZ	•
START CONT – ENG NO. 1 (7712-K4)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
START CONT – ENG NO. 2 (7712-K5)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
START CONT – ENG NO. 3 (7712-K6)	1	MESC, AFT BLKHD, RELAY PNL NO. 2/192K, 137AZ	•
SENSOR – BLEED AIR TEMPERATURE (ENG 1, 3)	2	PYLON/452CT, 462CT	36-11-11
SENSOR – BLEED AIR TEMPERATURE (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-11
SWITCHES:			
APU/GND AIR REVERSER (ENG 1, 7831-S1) (ENG 2, 7831-S2) (ENG 3, 7831-S3)	1	FLT STA, PILOTS LOWER REAR CTR CONSOLE/P18	•
BLEED AIR OVERTEMPERATURE, ENG 1 (3611-S6)	1	PYLON/452CT, 462CT	36-11-14
BLEED AIR OVERTEMPERATURE, ENG 2 (3611-S1)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-14
BLEED AIR OVERTEMPERATURE, ENG 3 (3611-S5)	1	PYLON/452CT, 462CT	36-11-14
BLEED AIR TEMPERATURE SEQUENCE (ENG 1, 3611-S3) (ENG 3, 3611-S2)	2	PYLON/452CT, 462CT	36-11-53
BLEED AIR TEMPERATURE SEQUENCE (ENG 2, 3611-S4)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-53
HIGH PRESSURE OVERPRESSURE	3	ENG SPLITTER/418BR, 428BR, 438BR	36-11-44
SWITCHLIGHTS:			
GND START/ASSIST AIR START – VALVE OPEN-1 (6011-DS4)	1	FLT STA, PILOTS OVHD PNL/P5	•
– VALVE OPEN-2 (6011-DS3)	1	FLT STA, PILOTS OVHD PNL/P5	•
– VALVE OPEN-3 (6011-DS2)	1	FLT STA, PILOTS OVHD PNL/P5	•
GND START – RELEASE – PUSH (6011-DS1)	1	FLT STA, PILOTS OVHD PNL/P5	•

*SEE WM EQUIPMENT LIST

MI-0000-36-0077

Component Location Index
Figure 101 (Sheet 3)

COMPONENT	QTY	AREA/ACCESS	REFERENCE
VALVES (CONT.)			
HIGH PRESSURE	3	ENG SPLITTER AREA/418BR, 428BR, 438BR	36-11-01
INTERMEDIATE PRESSURE ANTI-ICE CHECK (ENG 1, 3)	2	PYLON/452BT, 462BT	36-11-40
INTERMEDIATE PRESSURE ANTI-ICE CHECK (ENG 2)	1	CTR ENG SUPPORT STRUCT/471DL	36-11-40
OVERPRESSURE SHUTOFF (ENG 1, 3)	2	WING LEADING EDGE/511LB, 611LB	36-11-41
OVERPRESSURE SHUTOFF (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AR	36-11-41

*SEE WM EQUIPMENT LIST

M1-0000-32-5050

Component Location Index
Figure 101 (Sheet 4)

EFFECTIVITY: 001-023

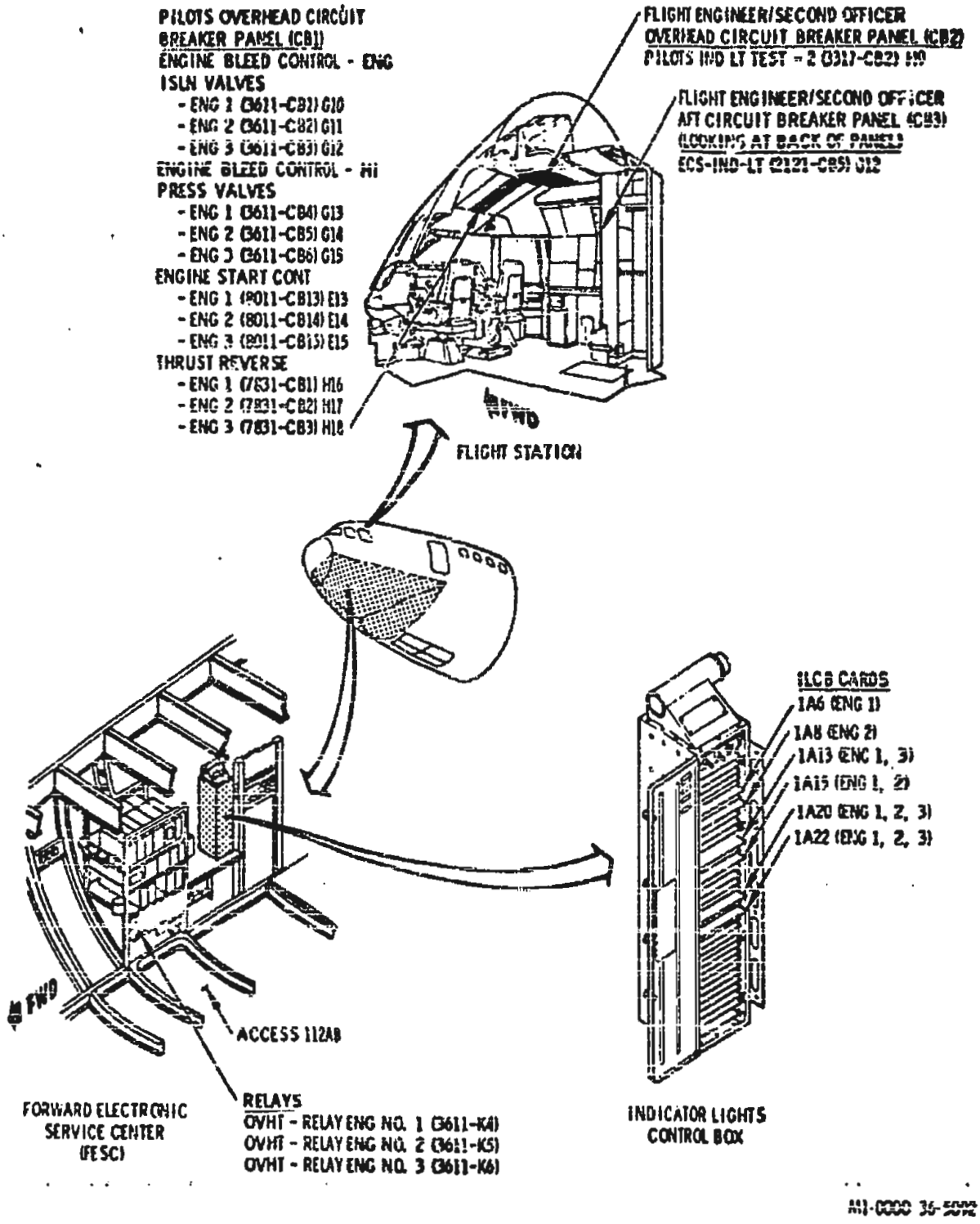
COMPONENT	QTY	AREA/ACCESS	REFERENCE
SWITCHLIGHTS (CONT.)			
NO. 1 – ENG ISLN VALVE (3611-DS1)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
NO. 2 – ENG ISLN VALVE (3611-DS2)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
NO. 3 – ENG ISLN VALVE (3611-DS3)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
NO. 1 – HI PRESS (3611-DS4)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
NO. 2 – HI PRESS (3611-DS5)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
NO. 3 – HI PRESS (3611-DS6)	1	FLT STA, FE/SO ENG BLEED CONTROL PNL/P11	•
VALVES:			
BLEED AIR OVERPRESSURE RELIEF (ENG 1, 3)	2	WING LEADING EDGE/511LB, 611LB	36-11-22
BLEED AIR OVERPRESSURE RELIEF (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AR	36-11-22
ENG NO. 1 ISOLATION (3611-A3)	1	WING LEADING EDGE/511LB, 611LB	36-11-16
ENG NO. 2 ISOLATION (3611-A1)	1	CTR ENG SUPPORT STRUCT/471AL	36-11-16
ENG NO. 3 ISOLATION (3611-A2)	1	WING LEADING EDGE/511LB, 611LB	36-11-16
HIGH PRESSURE DEACTIVATION (THRUST REVERSER)	3	ACCESSORY SECTION/ ENG 1 & 3; 414A, 424A ENG 2; 434CR	78-31-42
HIGH PRESSURE	3	ENG SPLITTER AREA/418BR, 428BR, 438CR	36-11-01
INTERMEDIATE PRESSURE ANTI-ICE CHECK (ENG 1, 3)	2	PYLON/462BT, 462BT	36-11-40
INTERMEDIATE PRESSURE ANTI-ICE CHECK (ENG 2)	1	CTR ENG SUPPORT STRUCT/471DL	36-11-40
OVERPRESSURE SHUTOFF (ENG 1, 3)	2	WING LEADING EDGE/511LB, 611LB	36-11-41
OVERPRESSURE SHUTOFF (ENG 2)	1	CTR ENG SUPPORT STRUCT/471AR	36-11-41

*SEE WM EQUIPMENT LIST

mt-4000-36-5081

R Component Location Index
R Figure 101 (Sheet 4)

R EFFECTIVITY: 024-999
R
001B

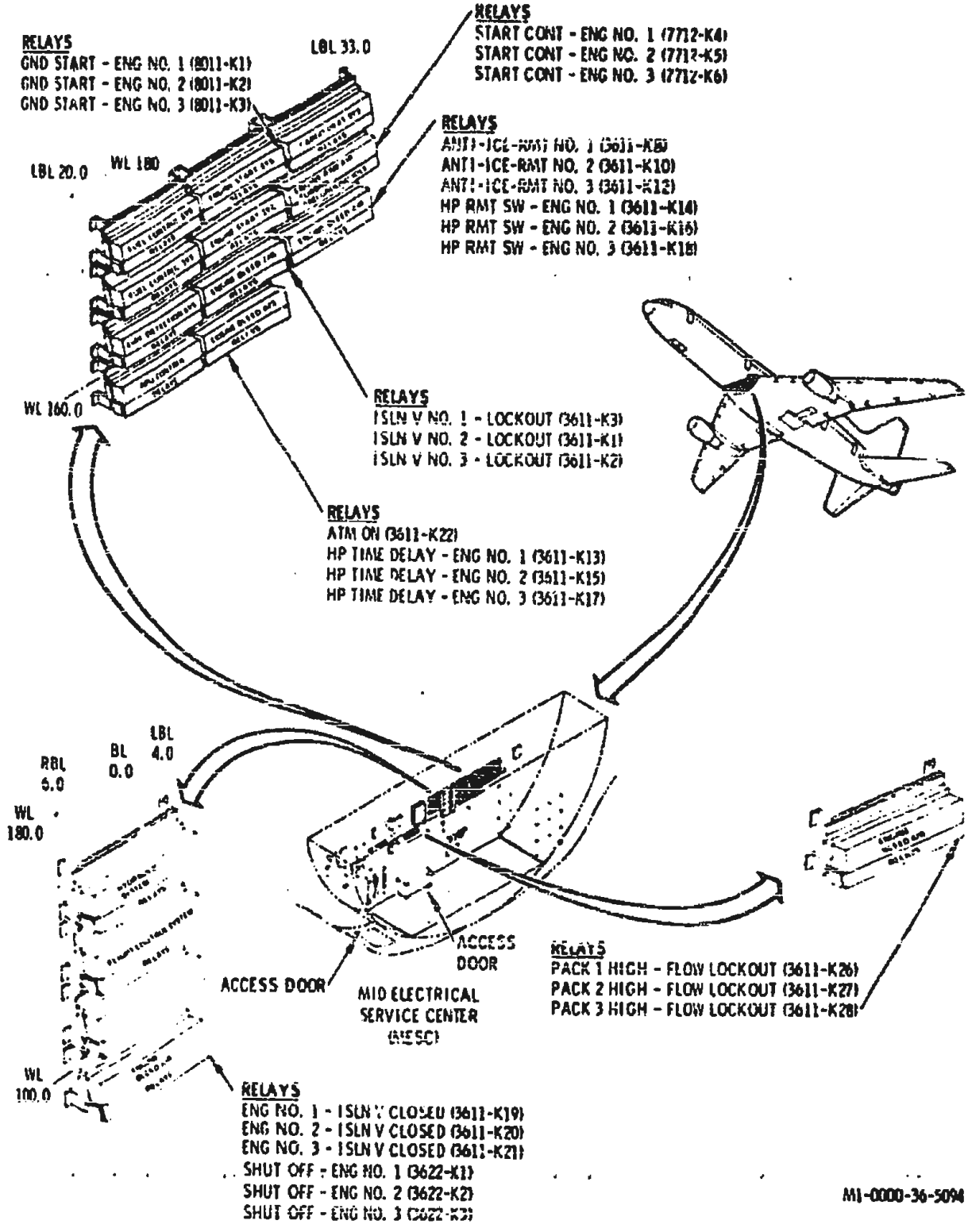

PILOTS OVERHEAD CIRCUIT BREAKER PANEL (CB1)
ENGINE BLEED CONTROL - ENG ISLN VALVES
- ENG 1 (3611-CB1) G10
- ENG 2 (3611-CB2) G11
- ENG 3 (3611-CB3) G12
ENGINE BLEED CONTROL - HI PRESS VALVES
- ENG 1 (3611-CB4) G13
- ENG 2 (3611-CB5) G14
- ENG 3 (3611-CB6) G15
ENGINE START CONT
- ENG 1 (8011-CB13) E13
- ENG 2 (8011-CB14) E14
- ENG 3 (8011-CB15) E15
THRUST REVERSE
- ENG 1 (7831-CB1) H16
- ENG 2 (7831-CB2) H17
- ENG 3 (7831-CB3) H18
FLIGHT ENGINEER/SECOND OFFICER OVERHEAD CIRCUIT BREAKER PANEL (CB2)
PILOTS IND LT TEST - 2 (3317-CB2) H9
FLIGHT ENGINEER/SECOND OFFICER AFT CIRCUIT BREAKER PANEL (CB3)
(LOOKING AT BACK OF PANEL)
ECS-IND-LT (2121-CB5) G12
FWD
FLIGHT STATION
ILCB CARDS
1A6 (ENG 1)
1A8 (ENG 2)
1A13 (ENG 1, 3)
1A15 (ENG 1, 2)
1A20 (ENG 1, 2, 3)
1A22 (ENG 1, 2, 3)
FWD
ACCESS 112AB
FORWARD ELECTRONIC SERVICE CENTER (FESC)
RELAYS
OVHT - RELAY ENG NO. 1 (3611-K4)
OVHT - RELAY ENG NO. 2 (3611-K5)
OVHT - RELAY ENG NO. 3 (3611-K6)
INDICATOR LIGHTS CONTROL BOX

M1-0000 36-5002

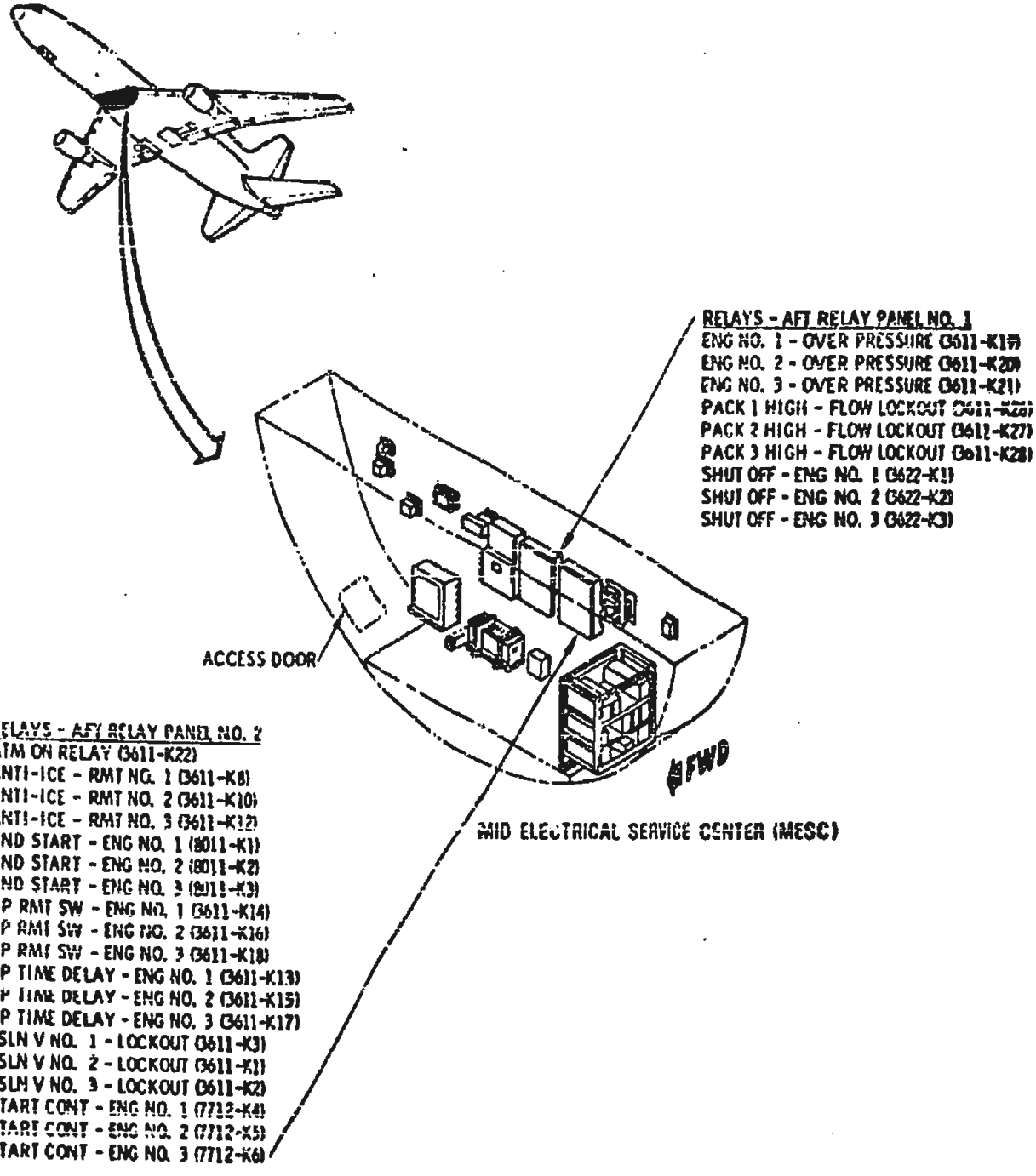
R R Component Locator Diagram
Figure 102 (Sheet 1)

R R EFFECTIVITY: ALL

001B

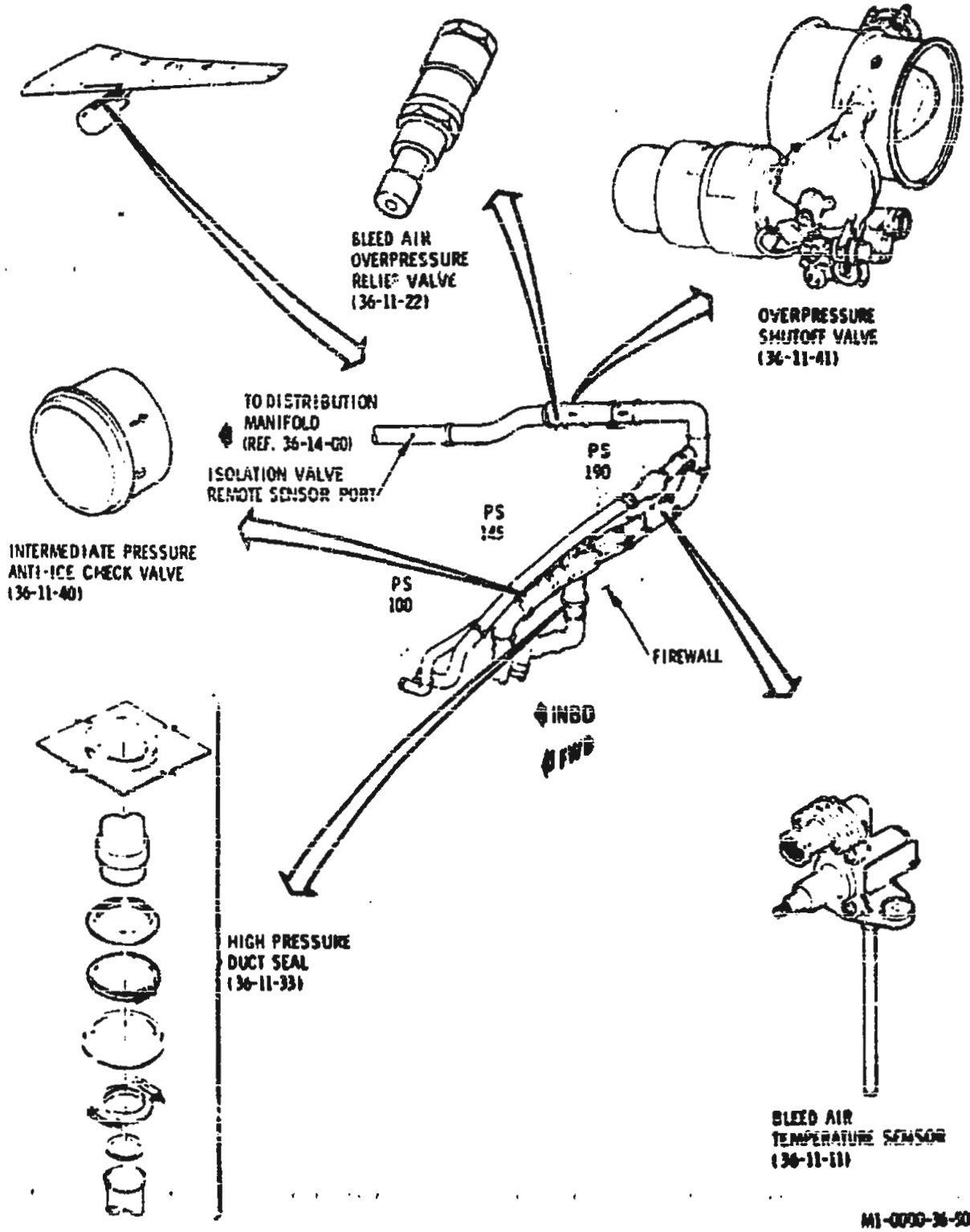

RELAYS
GND START - ENG NO. 1 (8011-K1)
GND START - ENG NO. 2 (8011-K2)
GND START - ENG NO. 3 (8011-K3)
LBL 33.0
LBL 20.0
WL 180
WL 160.0
RELAYS
START CONT - ENG NO. 1 (7712-K4)
START CONT - ENG NO. 2 (7712-K5)
START CONT - ENG NO. 3 (7712-K6)
RELAYS
ANTI-ICE-RMT NO. 1 (3611-K9)
ANTI-ICE-RMT NO. 2 (3611-K10)
ANTI-ICE-RMT NO. 3 (3611-K12)
HP RMT SW - ENG NO. 1 (3611-K14)
HP RMT SW - ENG NO. 2 (3611-K16)
HP RMT SW - ENG NO. 3 (3611-K18)
RELAYS
ISLN V NO. 1 - LOCKOUT (3611-K3)
ISLN V NO. 2 - LOCKOUT (3611-K1)
ISLN V NO. 3 - LOCKOUT (3611-K2)
RELAYS
ATM ON (3611-K22)
HP TIME DELAY - ENG NO. 1 (3611-K13)
HP TIME DELAY - ENG NO. 2 (3611-K15)
HP TIME DELAY - ENG NO. 3 (3611-K17)
RBL 6.0
BL 0.0
LBL 4.0
WL 180.0
WL 100.0
ACCESS DOOR
ACCESS DOOR
MID ELECTRICAL SERVICE CENTER (MESC)
RELAYS
PACK 1 HIGH - FLOW LOCKOUT (3611-K26)
PACK 2 HIGH - FLOW LOCKOUT (3611-K27)
PACK 3 HIGH - FLOW LOCKOUT (3611-K28)
RELAYS
ENG NO. 1 - ISLN V CLOSED (3611-K19)
ENG NO. 2 - ISLN V CLOSED (3611-K20)
ENG NO. 3 - ISLN V CLOSED (3611-K21)
SHUT OFF - ENG NO. 1 (3622-K1)
SHUT OFF - ENG NO. 2 (3622-K2)
SHUT OFF - ENG NO. 3 (3622-K3)
M1-0000-36-5094

R R Component Locator Diagram
Figure 102 (Sheet 2)


RELAYS - AFT RELAY PANEL NO. 1
ENG NO. 1 - OVER PRESSURE (3611-K19)
ENG NO. 2 - OVER PRESSURE (3611-K20)
ENG NO. 3 - OVER PRESSURE (3611-K21)
PACK 1 HIGH - FLOW LOCKOUT (3611-K26)
PACK 2 HIGH - FLOW LOCKOUT (3611-K27)
PACK 3 HIGH - FLOW LOCKOUT (3611-K28)
SHUT OFF - ENG NO. 1 (3622-K1)
SHUT OFF - ENG NO. 2 (3622-K2)
SHUT OFF - ENG NO. 3 (3622-K3)
ACCESS DOOR
FWD
MID ELECTRICAL SERVICE CENTER (MESC)
RELAYS - AFT RELAY PANEL NO. 2
ATM ON RELAY (3611-K22)
ANTI-ICE - RMT NO. 1 (3611-K8)
ANTI-ICE - RMT NO. 2 (3611-K10)
ANTI-ICE - RMT NO. 3 (3611-K12)
GND START - ENG NO. 1 (8011-K1)
GND START - ENG NO. 2 (8011-K2)
GND START - ENG NO. 3 (8011-K3)
HP RMT SW - ENG NO. 1 (3611-K14)
HP RMT SW - ENG NO. 2 (3611-K16)
HP RMT SW - ENG NO. 3 (3611-K18)
HP TIME DELAY - ENG NO. 1 (3611-K13)
HP TIME DELAY - ENG NO. 2 (3611-K15)
HP TIME DELAY - ENG NO. 3 (3611-K17)
ISLN V NO. 1 - LOCKOUT (3611-K3)
ISLN V NO. 2 - LOCKOUT (3611-K1)
ISLN V NO. 3 - LOCKOUT (3611-K2)
START CONT - ENG NO. 1 (7712-K4)
START CONT - ENG NO. 2 (7712-K5)
START CONT - ENG NO. 3 (7712-K6)

M1-0000-36-5095

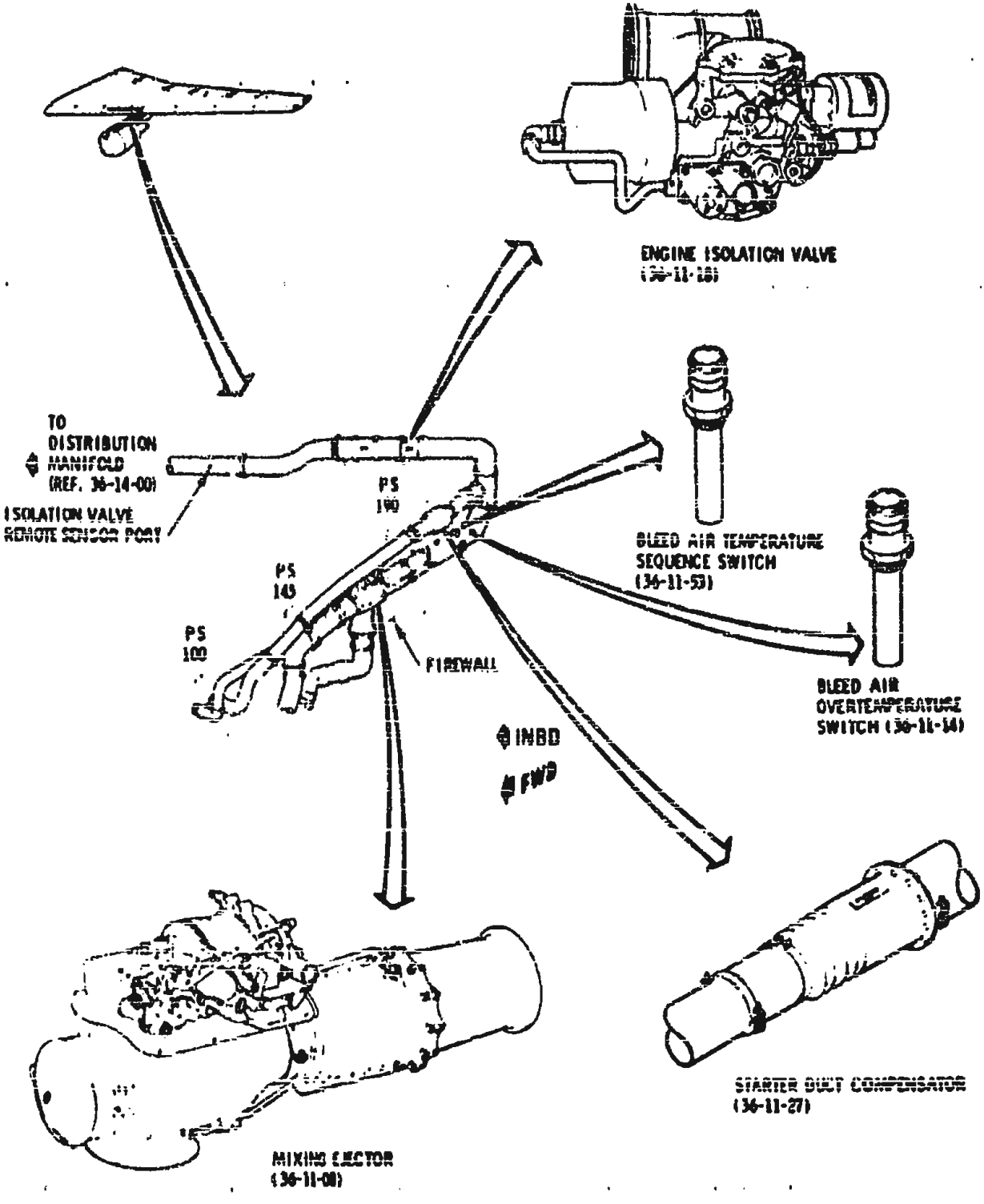
R R Component Locator Diagram
Figure 102 (Sheet 2)



M1-0000-36-2005

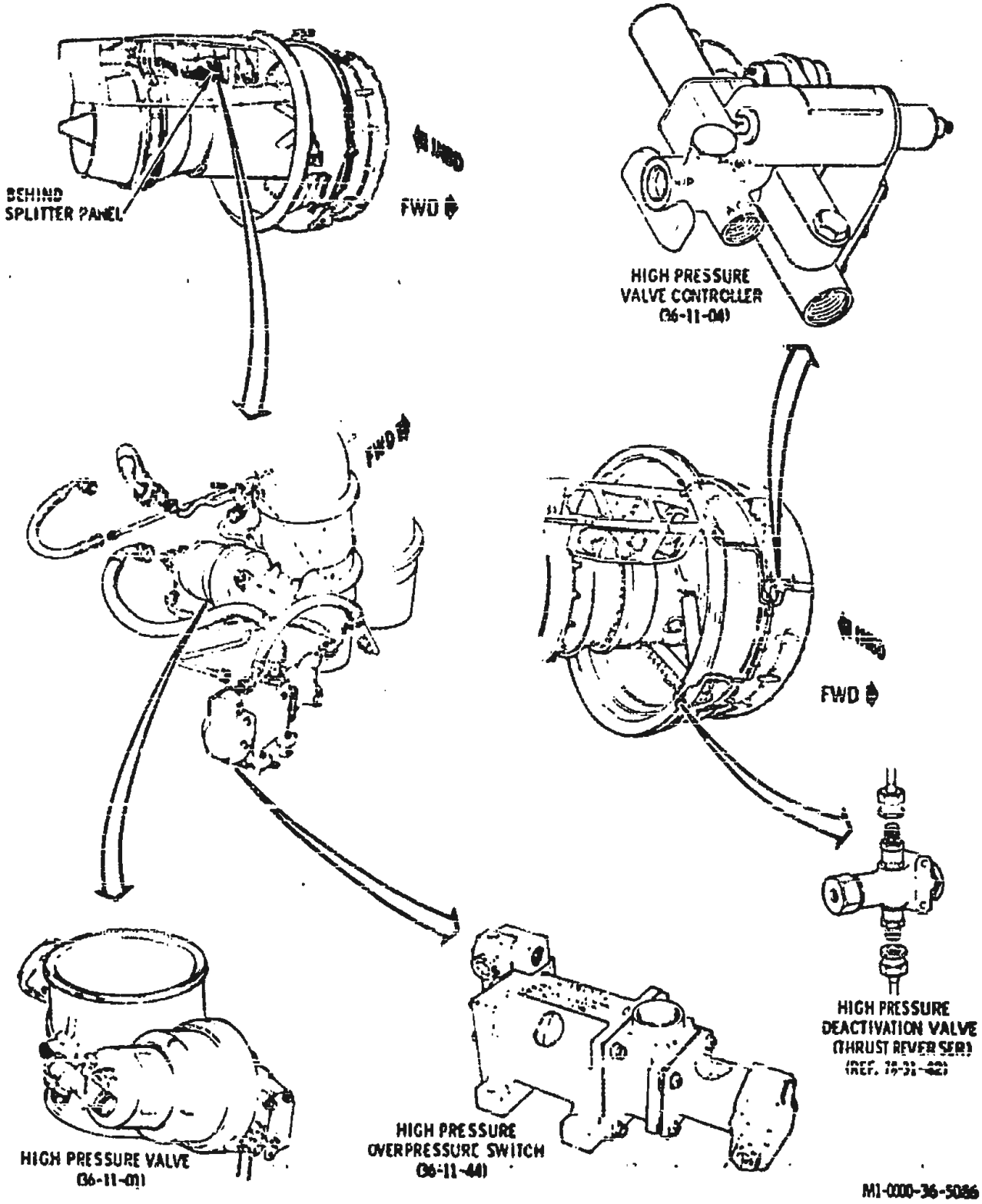
R Component Locator Diagram
R Wing Engine System
R Figure 102 (Sheet 3)

R EFFECTIVITY: ALL



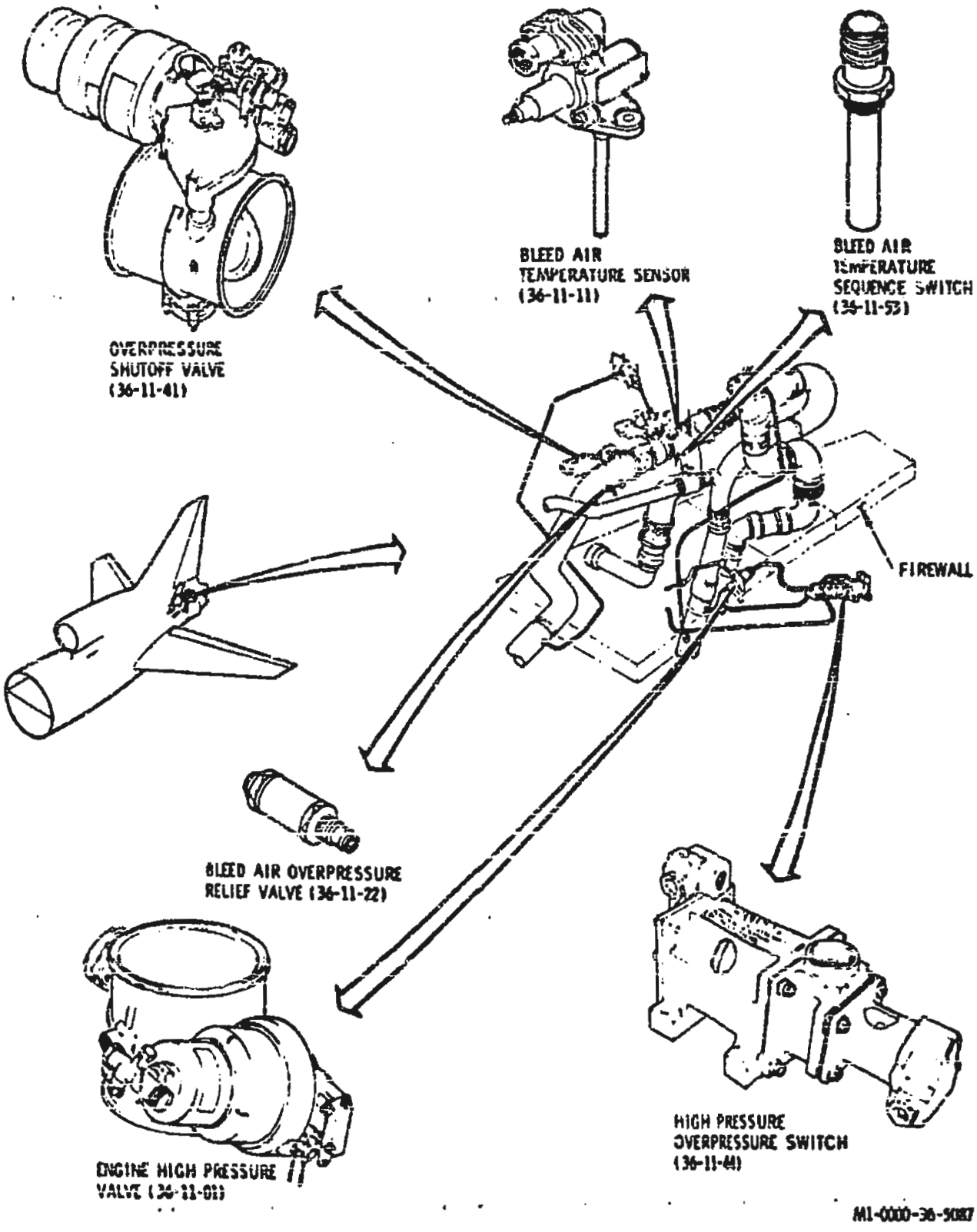
M1-0000-36-5101

Component Locator Diagram
Wing Engine System
Figure 102 (Sheet 4)



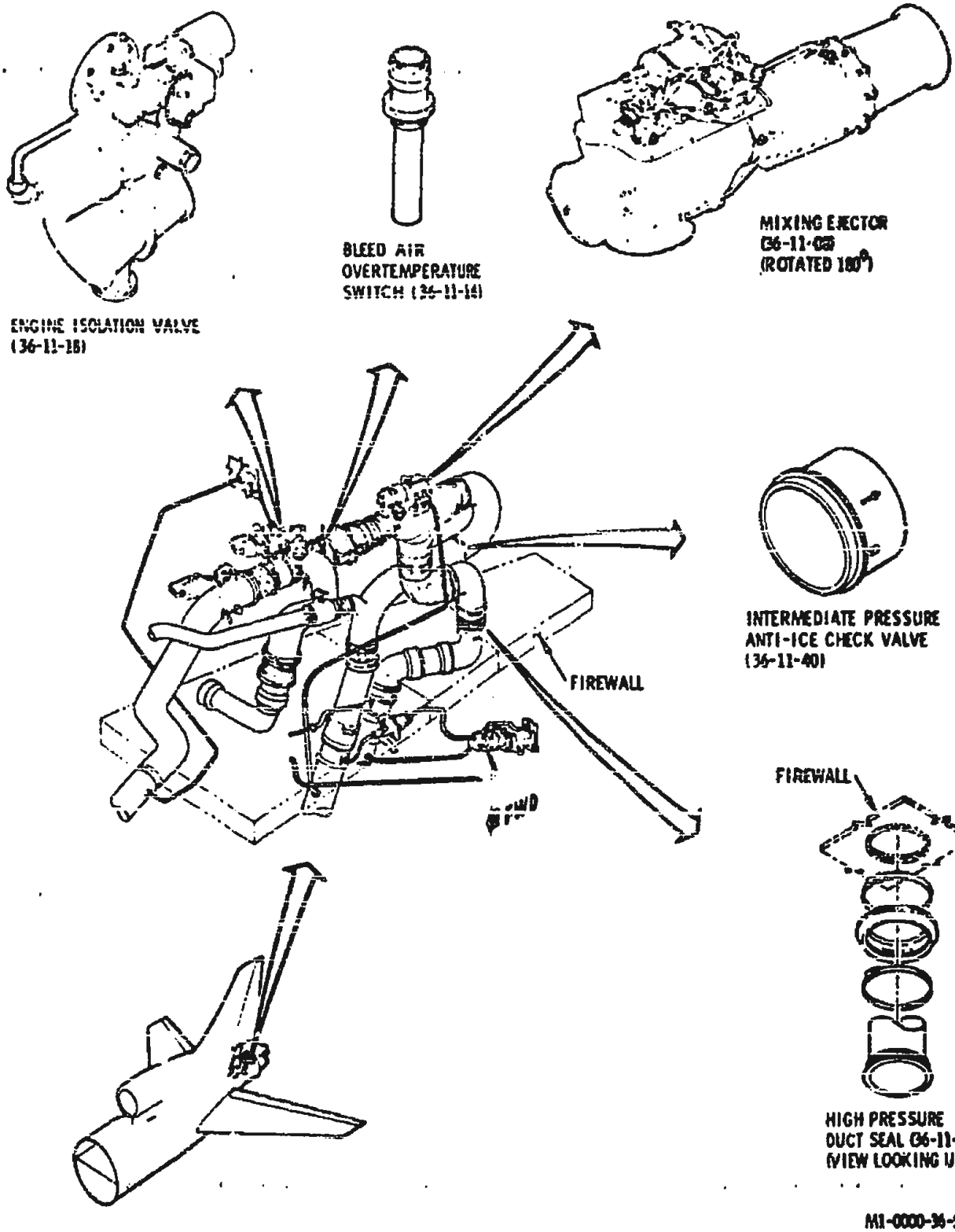
Component Locator Diagram
Wing Engine System
Figure 102 (Sheet 5)

EFFECTIVITY: ALL


OVERPRESSURE SHUTOFF VALVE (36-11-41)
BLEED AIR TEMPERATURE SENSOR (36-11-11)
BLEED AIR TEMPERATURE SEQUENCE SWITCH (36-11-53)
FIREWALL
BLEED AIR OVERPRESSURE RELIEF VALVE (36-11-22)
ENGINE HIGH PRESSURE VALVE (36-11-01)
HIGH PRESSURE OVERPRESSURE SWITCH (36-11-44)
M1-0000-36-9087

R Component Locator Diagram
R Center Engine System
R Figure 102 (Sheet 6)

R EFFECTIVITY: ALL

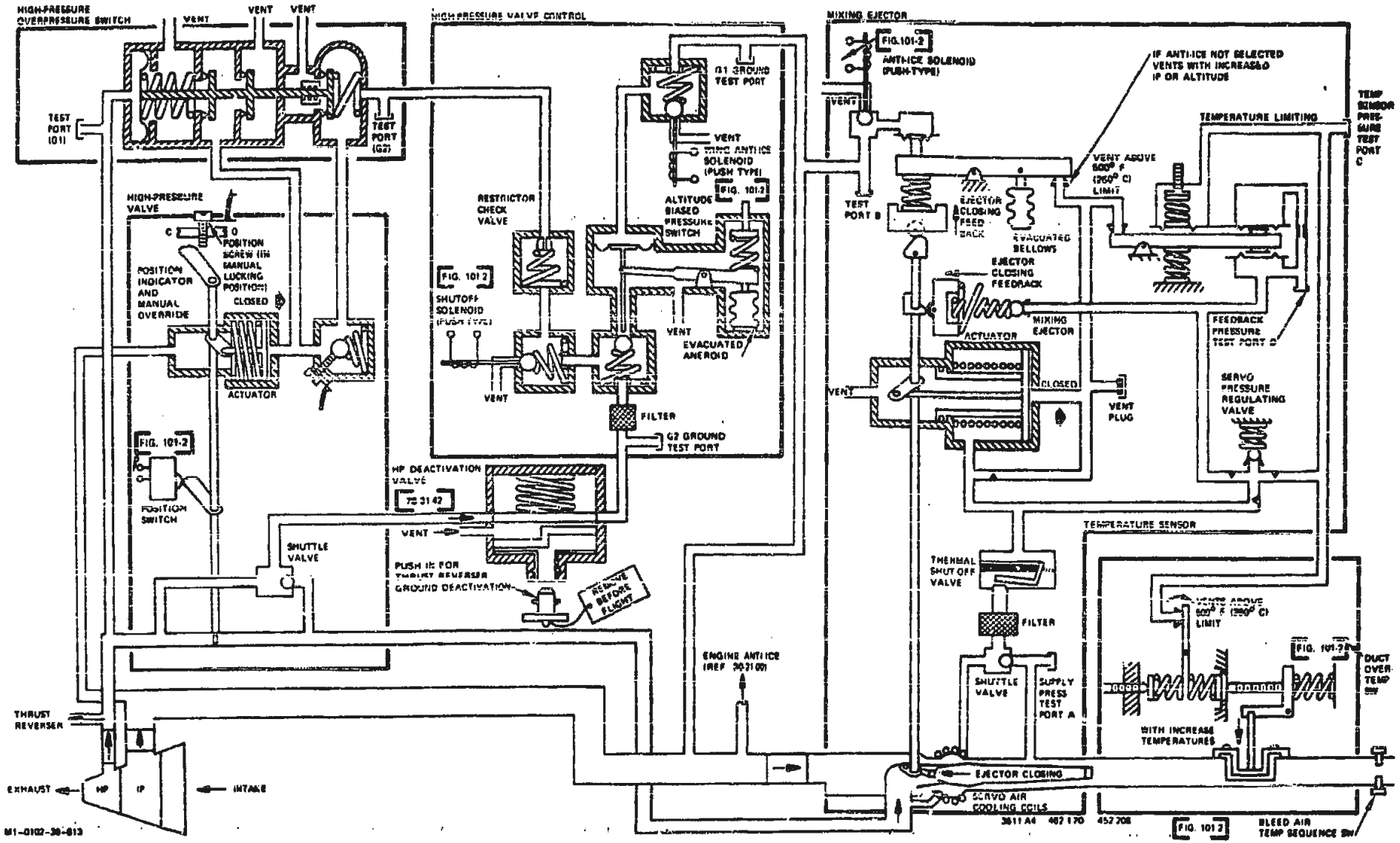


R
R
R

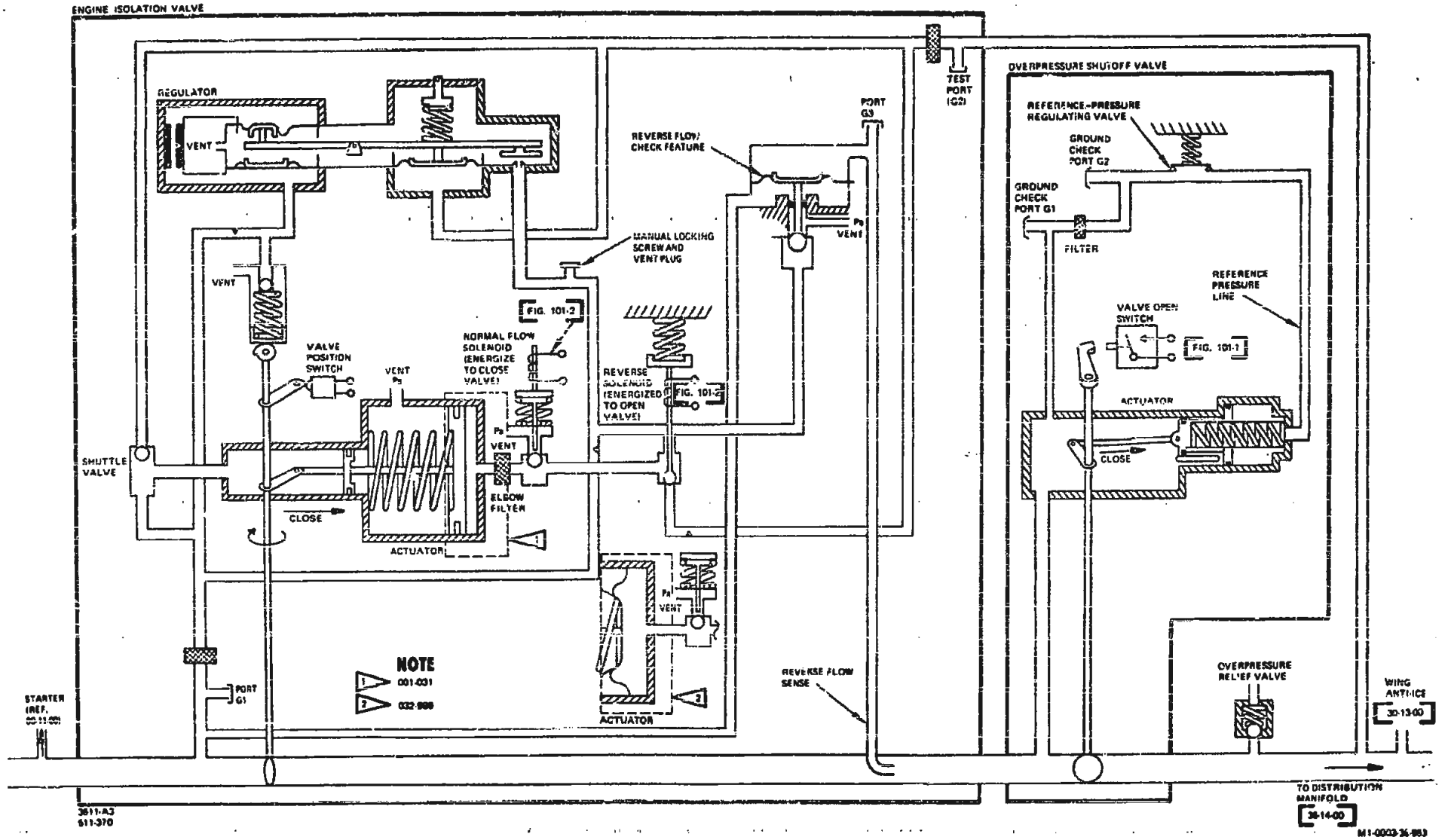
Component Locator Diagram
Center Engine System
Figure 102 (Sheet 7)

EFFECTIVITY: ALL

0018



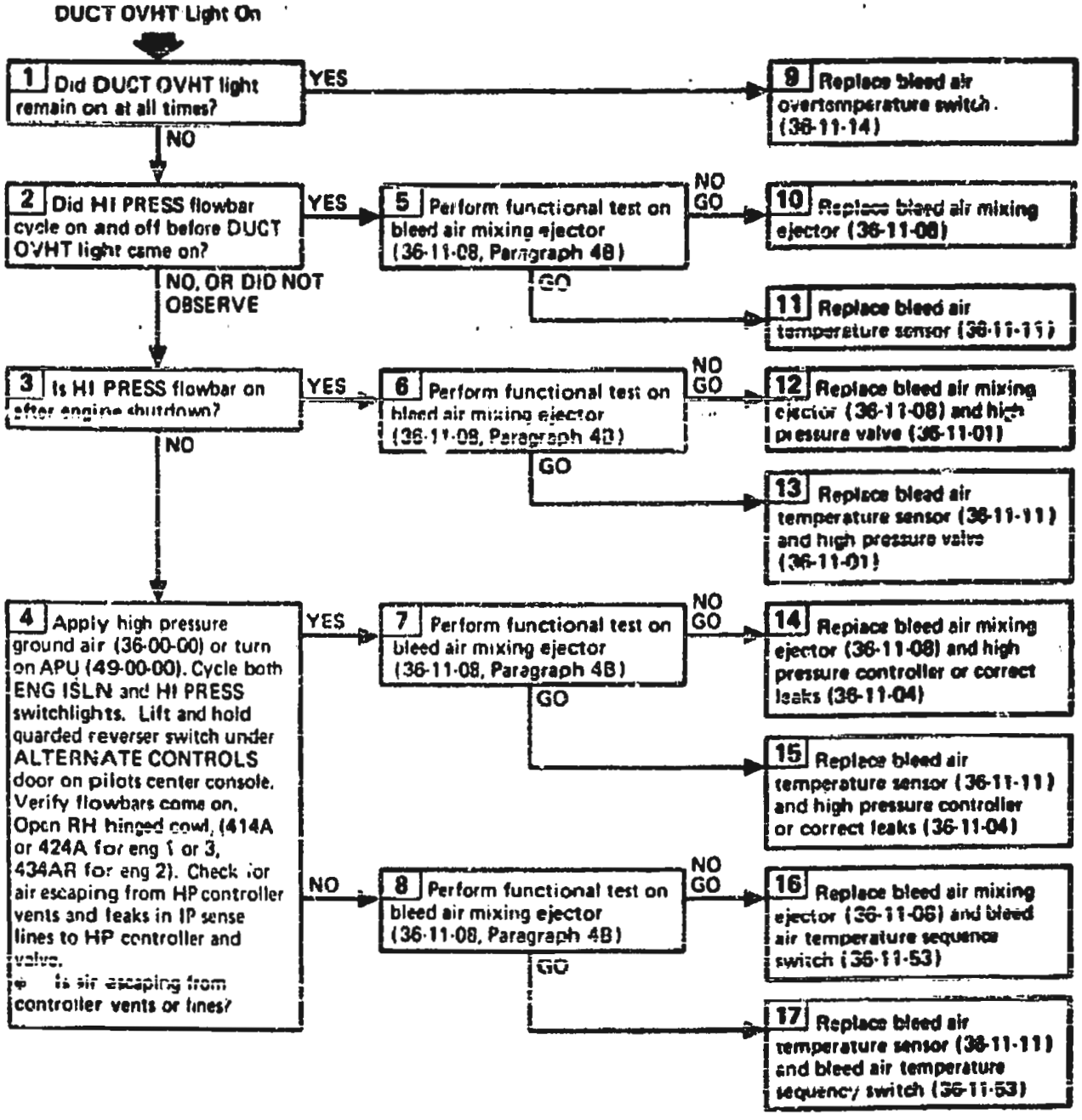
Engine Bleed Air Pneumatic Schematic
Figure 103 (Sheet 1)



R Engine Bleed Air Pneumatic Schematic
R Figure 103 (Sheet 2)

EFFECTIVITY: ALL

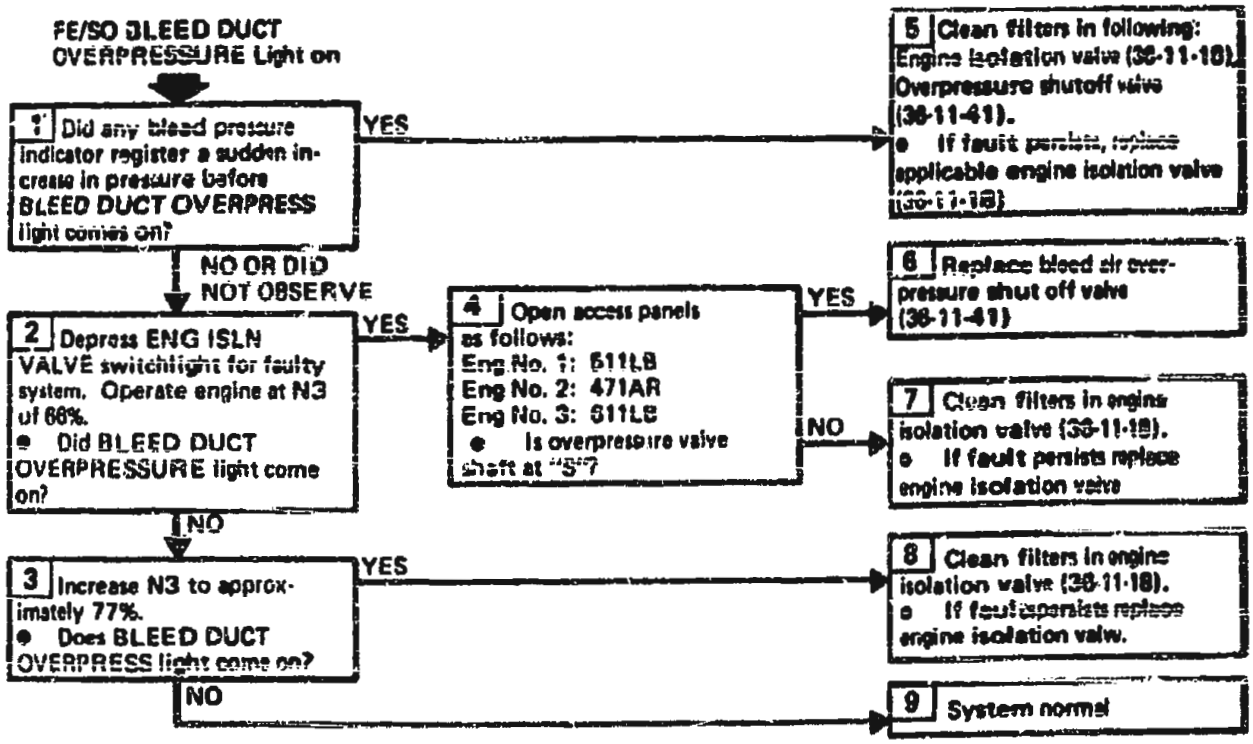
001a


DUCT OVHT Light On
1 Did DUCT OVHT light remain on at all times?
YES
9 Replace bleed air overtemperature switch. (36-11-14)
NO
2 Did HI PRESS flowbar cycle on and off before DUCT OVHT light came on?
YES
5 Perform functional test on bleed air mixing ejector (36-11-08, Paragraph 4B)
NO GO
10 Replace bleed air mixing ejector (36-11-08)
GO
11 Replace bleed air temperature sensor (36-11-11)
NO, OR DID NOT OBSERVE
3 Is HI PRESS flowbar on after engine shutdown?
YES
6 Perform functional test on bleed air mixing ejector (36-11-08, Paragraph 4B)
NO GO
12 Replace bleed air mixing ejector (36-11-08) and high pressure valve (36-11-01)
GO
13 Replace bleed air temperature sensor (36-11-11) and high pressure valve (36-11-01)
NO
4 Apply high pressure ground air (36-00-00) or turn on APU (49-00-00). Cycle both ENG ISLN and HI PRESS switchlights. Lift and hold guarded reverser switch under ALTERNATE CONTROLS door on pilots center console. Verify flowbars come on. Open RH hinged cowl, (414A or 424A for eng 1 or 3, 434AR for eng 2). Check for air escaping from HP controller vents and leaks in IP sense lines to HP controller and valve.
Is air escaping from controller vents or lines?
YES
7 Perform functional test on bleed air mixing ejector (36-11-08, Paragraph 4B)
NO GO
14 Replace bleed air mixing ejector (36-11-08) and high pressure controller or correct leaks (36-11-04)
GO
15 Replace bleed air temperature sensor (36-11-11) and high pressure controller or correct leaks (36-11-04)
NO
8 Perform functional test on bleed air mixing ejector (36-11-08, Paragraph 4B)
NO GO
16 Replace bleed air mixing ejector (36-11-06) and bleed air temperature sequence switch (36-11-53)
GO
17 Replace bleed air temperature sensor (36-11-11) and bleed air temperature sequency switch (36-11-53)

PREREQUISITES
Electrical Power (24-00-00)
Pneumatic (36-00-00)
CB's in: 1G10-15

M1-0102-36-5041

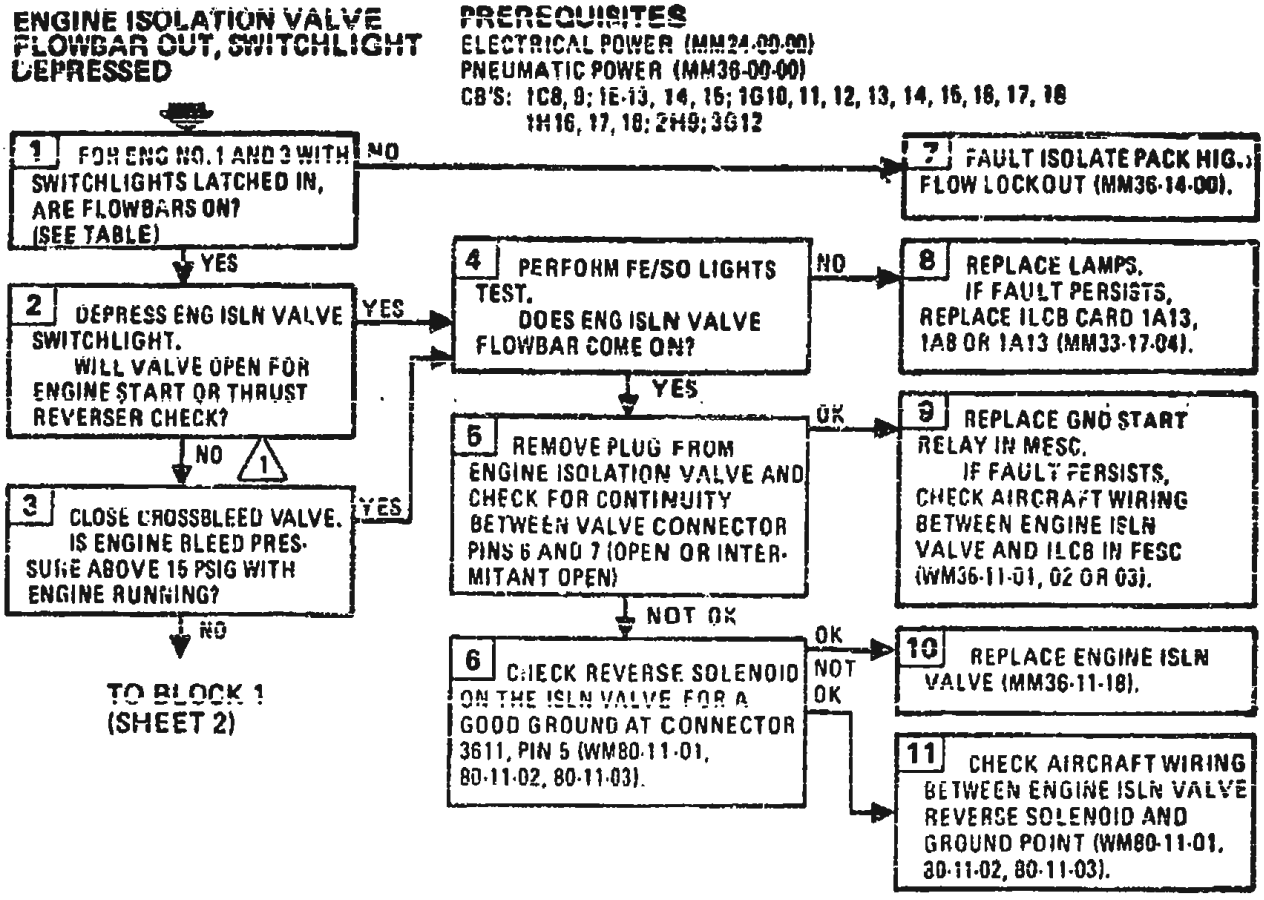
Engine (1, 2, 3) DUCT OVHT Light On
Figure 104


FE/SO BLEED DUCT OVERPRESSURE Light on
1 Did any bleed pressure indicator register a sudden increase in pressure before BLEED DUCT OVERPRESS light comes on?
YES
NO OR DID NOT OBSERVE
2 Depress ENG ISLN VALVE switchlight for faulty system. Operate engine at N3 of 66%.
• Did BLEED DUCT OVERPRESSURE light come on?
YES
NO
3 Increase N3 to approximately 77%.
• Does BLEED DUCT OVERPRESS light come on?
YES
NO
4 Open access panels as follows:
Eng No. 1: 611LB
Eng No. 2: 471AR
Eng No. 3: 611LB
• Is overpressure valve shaft at "S"?
YES
NO
5 Clean filters in following:
Engine isolation valve (36-11-18).
Overpressure shutoff valve (36-11-41).
• If fault persists, replace applicable engine isolation valve (36-11-18).
6 Replace bleed air overpressure shut off valve (36-11-41)
7 Clean filters in engine isolation valve (36-11-18).
• If fault persists replace engine isolation valve
8 Clean filters in engine isolation valve (36-11-18).
• If fault persists replace engine isolation valve.
9 System normal

PREREQUISITES
Electrical power (24-00-00), Pneumatic power (36-00-00), push CBs in 1G10 thru 15; 2H9; 2D22

M1-0102-39-9001

FE/SO BLEED DUCT OVERPRESS Light On
Figure 105


ENGINE ISOLATION VALVE FLOWBAR OUT, SWITCHLIGHT DEPRESSED
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: 1C8, 9; 1E13, 14, 15; 1G10, 11, 12, 13, 14, 15, 16, 17, 18
1H16, 17, 18; 2H9; 3G12
1 FOR ENG NO.1 AND 3 WITH SWITCHLIGHTS LATCHED IN, ARE FLOWBARS ON? (SEE TABLE)
NO
7 FAULT ISOLATE PACK HIGH FLOW LOCKOUT (MM36-14-00).
YES
2 DEPRESS ENG ISLN VALVE SWITCHLIGHT. WILL VALVE OPEN FOR ENGINE START OR THRUST REVERSER CHECK?
YES
4 PERFORM FE/SO LIGHTS TEST. DOES ENG ISLN VALVE FLOWBAR COME ON?
NO
8 REPLACE LAMPS. IF FAULT PERSISTS, REPLACE ILCB CARD 1A13, 1A8 OR 1A13 (MM33-17-04).
NO
1
3 CLOSE CROSSBLEED VALVE. IS ENGINE BLEED PRESSURE ABOVE 15 PSIG WITH ENGINE RUNNING?
YES
YES
5 REMOVE PLUG FROM ENGINE ISOLATION VALVE AND CHECK FOR CONTINUITY BETWEEN VALVE CONNECTOR PINS 6 AND 7 (OPEN OR INTERMITANT OPEN)
OK
9 REPLACE GND START RELAY IN MESC. IF FAULT PERSISTS, CHECK AIRCRAFT WIRING BETWEEN ENGINE ISLN VALVE AND ILCB IN FESC (WM36-11-01, 02 OR 03).
NOT OK
6 CHECK REVERSE SOLENOID ON THE ISLN VALVE FOR A GOOD GROUND AT CONNECTOR 3611, PIN 5 (WM80-11-01, 80-11-02, 80-11-03).
OK
NOT OK
10 REPLACE ENGINE ISLN VALVE (MM36-11-18).
11 CHECK AIRCRAFT WIRING BETWEEN ENGINE ISLN VALVE REVERSE SOLENOID AND GROUND POINT (WM80-11-01, 80-11-02, 80-11-03).
TO BLOCK 1 (SHEET 2)

1 NOTE
MANUALLY OPEN VALVE FOR ENGINE START AND CLOSE VALVE MANUALLY AFTER ENGINE START. DO NOT LOCK OPEN

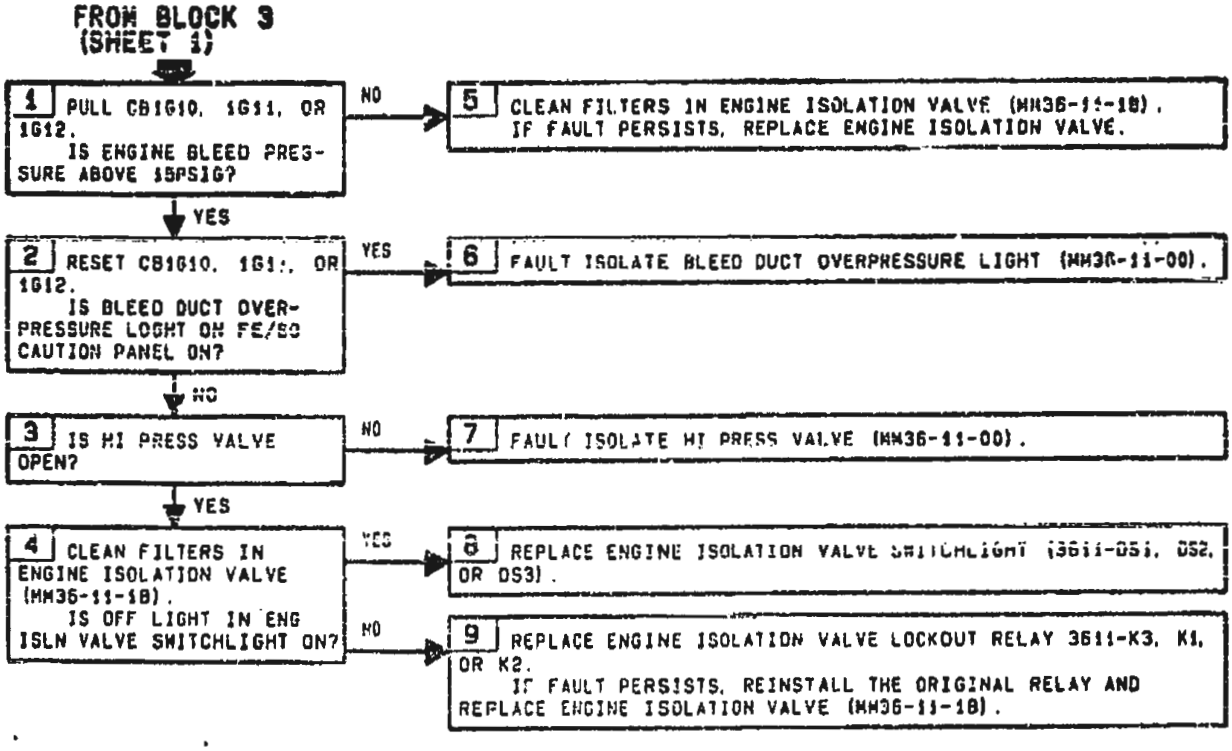
FLOWBARS	ENG 1	ENG 3
L CROSS BLEED	X	
AFT ISLN VALVE		
R CROSS BLEED		X
PACK FLOW CONTROL	X	X

M1-0006-36-5002

R ENG ISLN VALVE Flowbar Out, Switchlight Depressed
R Figure 106 (Sheet 1)

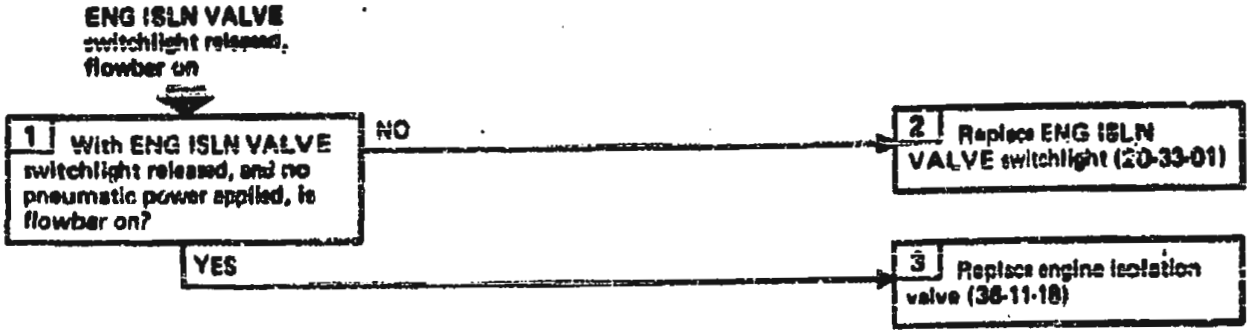
EFFECTIVITY: ALL

PREREQUISITES
SEE SHEET 1


FROM BLOCK 3
(SHEET 1)
1 PULL CB1G10, 1G11, OR 1G12.
IS ENGINE BLEED PRESSURE ABOVE 15PSIG?
NO
5 CLEAN FILTERS IN ENGINE ISOLATION VALVE (MM36-11-18). IF FAULT PERSISTS, REPLACE ENGINE ISOLATION VALVE.
YES
2 RESET CB1G10, 1G11, OR 1G12.
IS BLEED DUCT OVERPRESSURE LOGHT ON FE/SD CAUTION PANEL ON?
YES
6 FAULT ISOLATE BLEED DUCT OVERPRESSURE LIGHT (MM36-11-00).
NO
3 IS HI PRESS VALVE OPEN?
NO
7 FAULT ISOLATE HI PRESS VALVE (MM36-11-00).
YES
4 CLEAN FILTERS IN ENGINE ISOLATION VALVE (MM36-11-18).
IS OFF LIGHT IN ENG ISLN VALVE SWITCHLIGHT ON?
YES
8 REPLACE ENGINE ISOLATION VALVE SWITCHLIGHT (3611-DS1, DS2, OR DS3).
NO
9 REPLACE ENGINE ISOLATION VALVE LOCKOUT RELAY 3611-K3, K1, OR K2.
IF FAULT PERSISTS, REINSTALL THE ORIGINAL RELAY AND REPLACE ENGINE ISOLATION VALVE (MM36-11-18).

H1-0000-36-1075

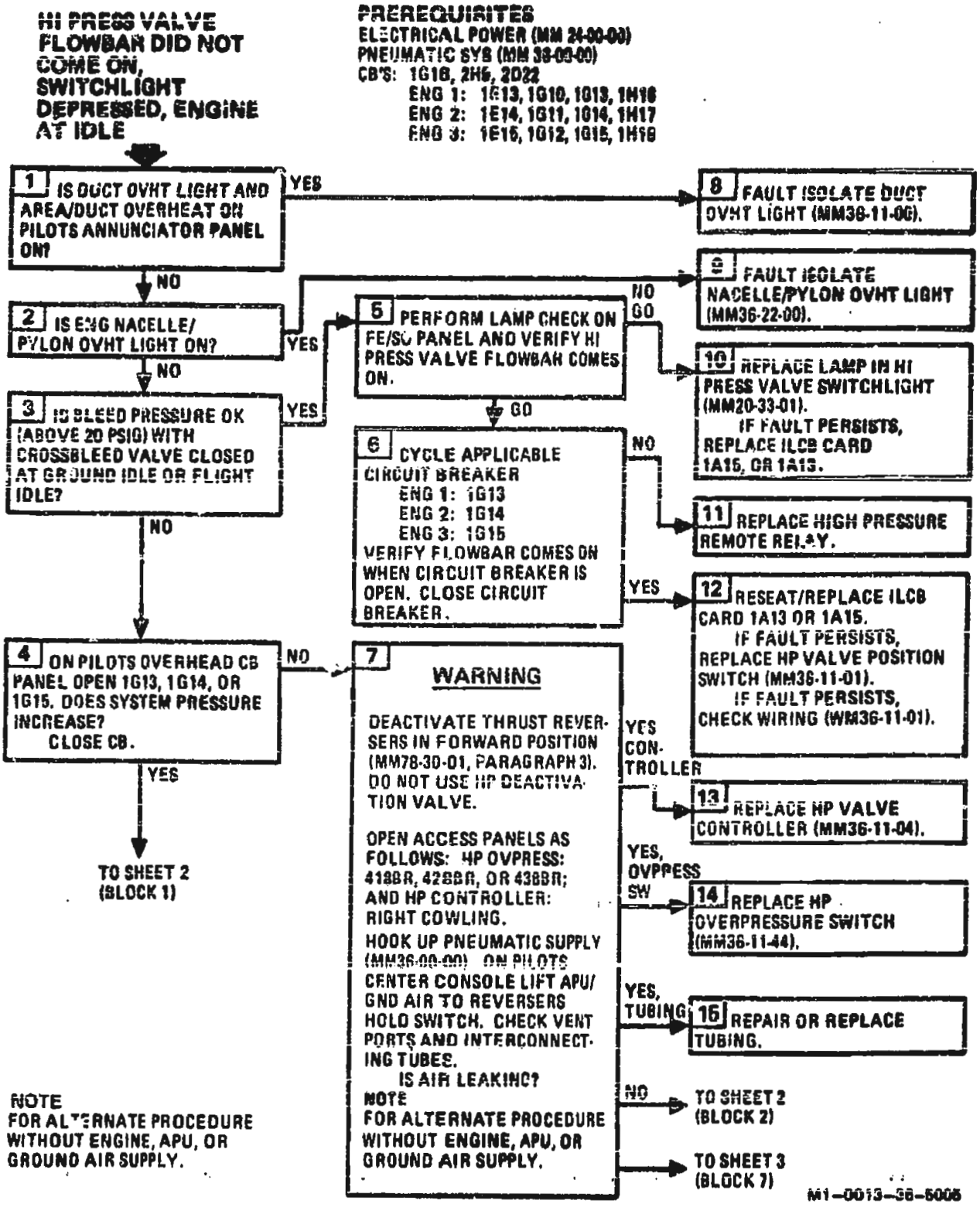
R ENG ISLN VALVE Flowbar Out, Switchlight Depressed
R Figure 106 (Sheet 2)


ENG ISLN VALVE
switchlight released,
flowbar on
1 With ENG ISLN VALVE switchlight released, and no pneumatic power applied, is flowbar on?
NO
2 Replace ENG ISLN VALVE switchlight (20-33-01)
YES
3 Replace engine isolation valve (36-11-18)

PREREQUISITES
Electrical Power (24-00-00)
CB's in: 1G10, 1G11, 1G12

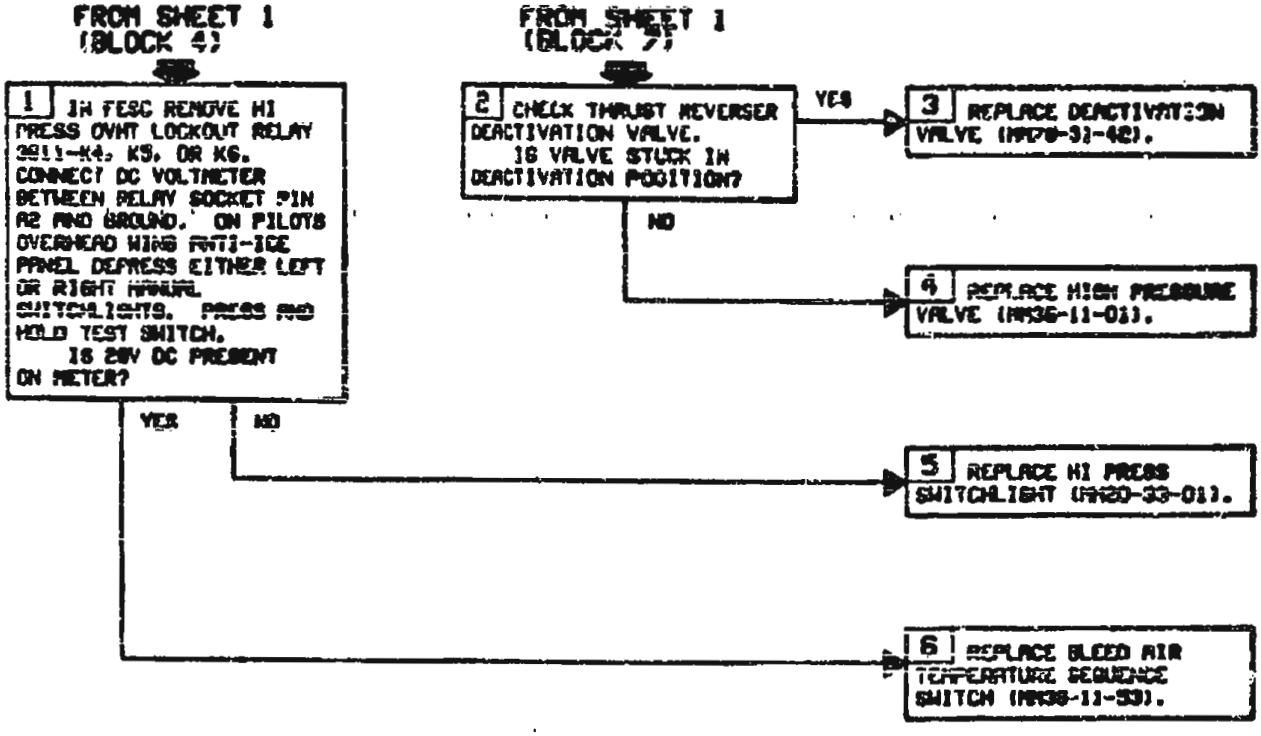
M1-0100-36-5062

ENG ISLN VALVE Switchlight Released, Flowbar On
Figure 107


HI PRESS VALVE FLOWBAR DID NOT COME ON, SWITCHLIGHT DEPRESSED, ENGINE AT IDLE
PREREQUISITES
ELECTRICAL POWER (MM 24-00-00)
PNEUMATIC SYS (MM 36-00-00)
CB'S: 1G16, 2H6, 2D22
ENG 1: 1G13, 1G10, 1G13, 1H16
ENG 2: 1E14, 1G11, 1G14, 1H17
ENG 3: 1E15, 1G12, 1G15, 1H18
1 IS DUCT OVHT LIGHT AND AREA/DUCT OVERHEAT ON PILOTS ANNUNCIATOR PANEL ON?
YES
8 FAULT ISOLATE DUCT OVHT LIGHT (MM36-11-00).
NO
2 IS ENG NACELLE/ PYLON OVHT LIGHT ON?
YES
9 FAULT ISOLATE NACELLE/PYLON OVHT LIGHT (MM36-22-00).
NO
3 IS BLEED PRESSURE OK (ABOVE 20 PSIG) WITH CROSSBLEED VALVE CLOSED AT GROUND IDLE OR FLIGHT IDLE?
YES
5 PERFORM LAMP CHECK ON FE/SC PANEL AND VERIFY HI PRESS VALVE FLOWBAR COMES ON.
NO GO
10 REPLACE LAMP IN HI PRESS VALVE SWITCHLIGHT (MM20-33-01).
IF FAULT PERSISTS, REPLACE ILCB CARD 1A15, OR 1A13.
GO
6 CYCLE APPLICABLE CIRCUIT BREAKER
ENG 1: 1G13
ENG 2: 1G14
ENG 3: 1G15
VERIFY FLOWBAR COMES ON WHEN CIRCUIT BREAKER IS OPEN. CLOSE CIRCUIT BREAKER.
NO
11 REPLACE HIGH PRESSURE REMOTE RELAY.
YES
12 RESEAT/REPLACE ILCB CARD 1A13 OR 1A15.
IF FAULT PERSISTS, REPLACE HP VALVE POSITION SWITCH (MM36-11-01).
IF FAULT PERSISTS, CHECK WIRING (WM36-11-01).
NO
4 ON PILOTS OVERHEAD CB PANEL OPEN 1G13, 1G14, OR 1G15. DOES SYSTEM PRESSURE INCREASE?
CLOSE CB.
YES
TO SHEET 2 (BLOCK 1)
7 WARNING
DEACTIVATE THRUST REVERSERS IN FORWARD POSITION (MM78-30-01, PARAGRAPH 3). DO NOT USE HP DEACTIVATION VALVE.
OPEN ACCESS PANELS AS FOLLOWS: HP OVPRESS: 418BR, 428BR, OR 438BR; AND HP CONTROLLER: RIGHT COWLING.
HOOK UP PNEUMATIC SUPPLY (MM36-00-00) ON PILOTS CENTER CONSOLE LIFT APU/ GND AIR TO REVERSERS HOLD SWITCH. CHECK VENT PORTS AND INTERCONNECTING TUBES.
IS AIR LEAKING?
NOTE
FOR ALTERNATE PROCEDURE WITHOUT ENGINE, APU, OR GROUND AIR SUPPLY.
YES, CONTROLLER
13 REPLACE HP VALVE CONTROLLER (MM36-11-04).
YES, OVPPESS SW
14 REPLACE HP OVERPRESSURE SWITCH (MM36-11-44).
YES, TUBING
16 REPAIR OR REPLACE TUBING.
NO
TO SHEET 2 (BLOCK 2)
TO SHEET 3 (BLOCK 7)
NOTE
FOR ALTERNATE PROCEDURE WITHOUT ENGINE, APU, OR GROUND AIR SUPPLY.
M1-0013-36-5006

R HI PRESS Flowbar Out, Switchlight Depressed, Engine At Idle
R Figure 108 (Sheet 1)

PREREQUISITES
ELECTRICAL POWER (XXXX-XX-XX)
PNEUMATIC SYSTEM (XX36-XX-XX)
CB'S: 1B19, B20, 2B22
ENG 1: 1E13, 1B10, 1B13, 1H18
ENG 2: 1E14, 1B11, 1B14, 1H17
ENG 3: 1E15, 1B12, 1B15, 1H16

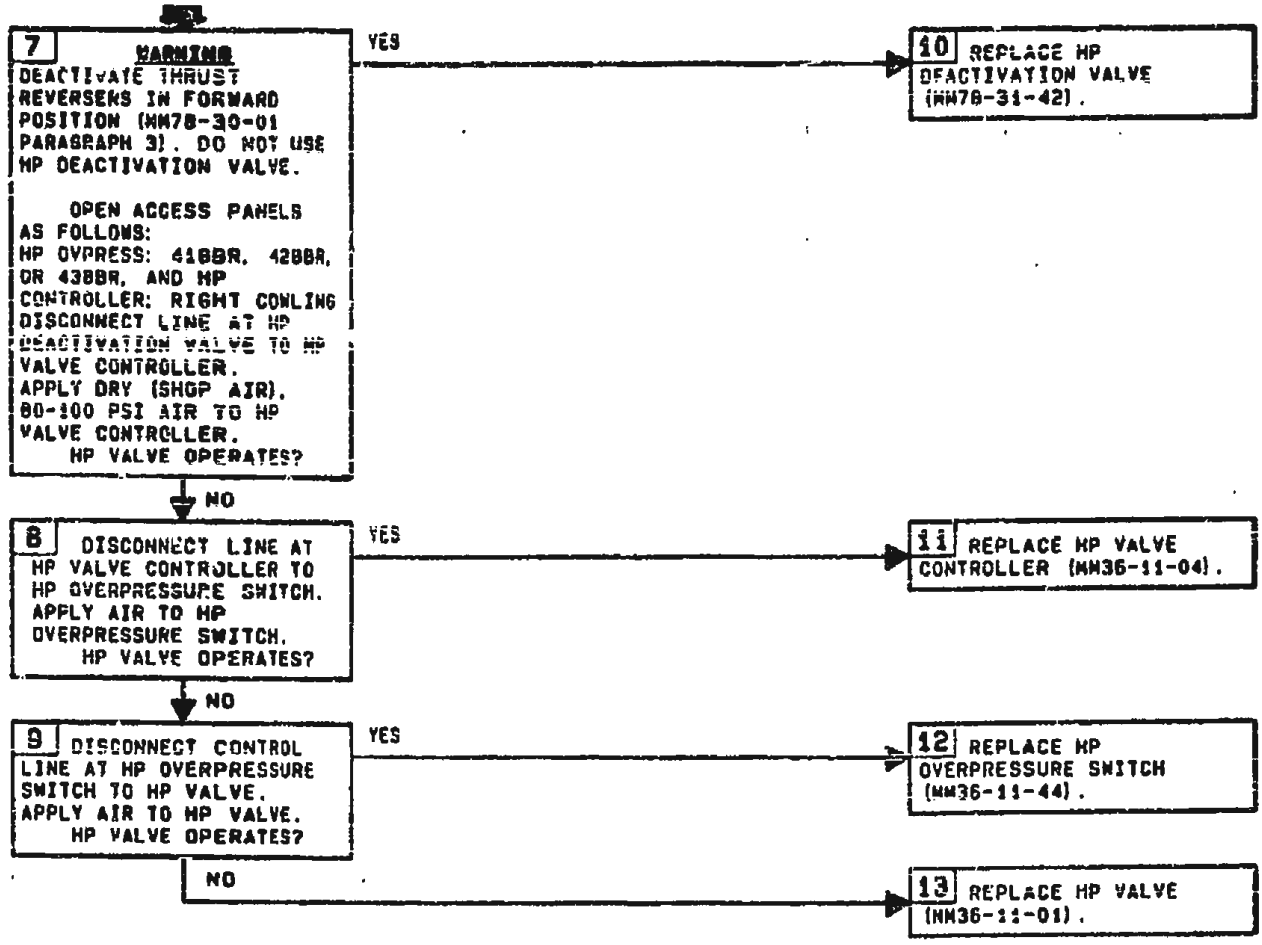

FROM SHEET 1 (BLOCK 4)
FROM SHEET 1 (BLOCK 7)
1 IN FESC REMOVE HI PRESS OVHT LOCKOUT RELAY 3911-K4, K5, OR K6. CONNECT DC VOLTMETER BETWEEN RELAY SOCKET PIN A2 AND GROUND. ON PILOTS OVERHEAD WING ANTI-ICE PANEL DEPRESS EITHER LEFT OR RIGHT MANUAL SWITCHLIGHTS. PRESS AND HOLD TEST SWITCH. IS 28V DC PRESENT ON METER?
YES
NO
2 CHECK THRUST REVERSER DEACTIVATION VALVE. IS VALVE STUCK IN DEACTIVATION POSITION?
YES
NO
3 REPLACE DEACTIVATION VALVE (XX78-31-42).
4 REPLACE HIGH PRESSURE VALVE (XX36-11-01).
5 REPLACE HI PRESS SWITCHLIGHT (XX20-33-01).
6 REPLACE BLEED AIR TEMPERATURE SEQUENCE SWITCH (XX36-11-33).

JU-0001-36-0004

HI PRESS Flowbar Out, Switchlight Depressed, Engine at Idle
Figure 108 (Sheet 2)

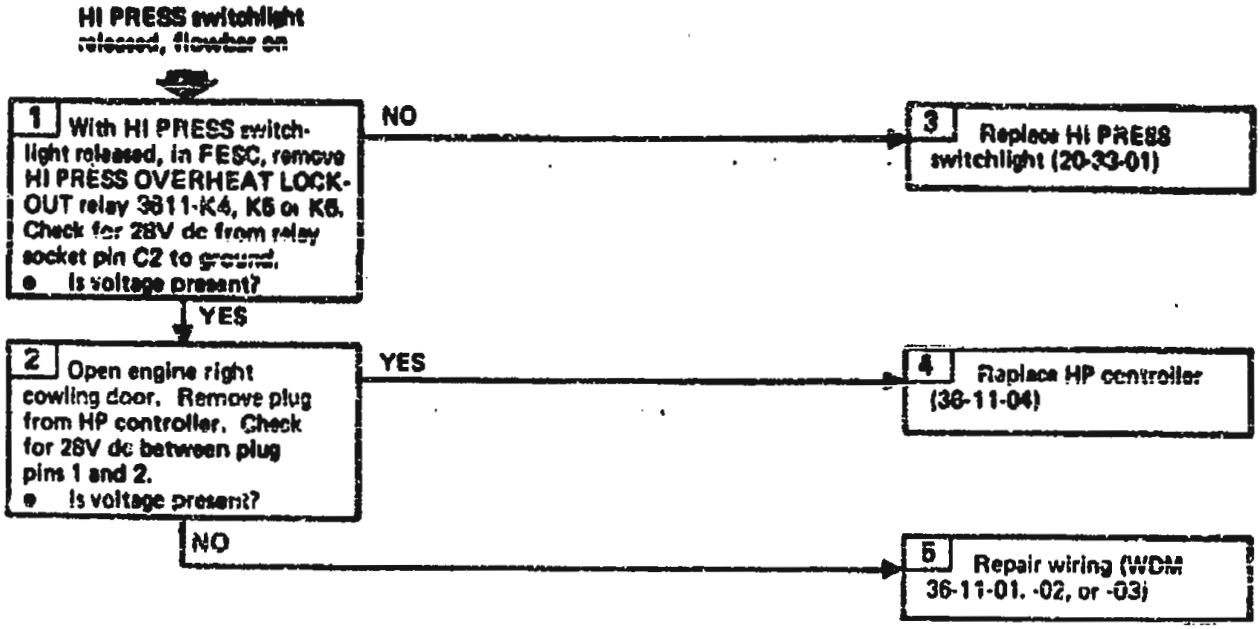
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC SYSTEM (MM36-00-00)
CB'S: 1B16, 2H9, 2D22
ENG 1: 1E13, 1B10, 1B13, 1H16
ENG 2: 1E14, 1B11, 1B14, 1H17
ENG 3: 1E15, 1B12, 1B15, 1H19

FROM SHEET 1 (BLOCK 7)
(ALTERNATE PROCEDURE WHEN WITHOUT ENGINE, APU, OR GROUND AIR SUPPLY)


7 WARNING
DEACTIVATE THRUST REVERSERS IN FORWARD POSITION (MM78-30-01 PARAGRAPH 3). DO NOT USE HP DEACTIVATION VALVE.
OPEN ACCESS PANELS AS FOLLOWS:
HP OVPRESS: 418BR, 428BR, OR 438BR, AND HP CONTROLLER: RIGHT COWLING
DISCONNECT LINE AT HP DEACTIVATION VALVE TO HP VALVE CONTROLLER.
APPLY DRY (SHOP AIR), 80-100 PSI AIR TO HP VALVE CONTROLLER.
HP VALVE OPERATES?
YES
10 REPLACE HP DEACTIVATION VALVE (MM78-31-42).
NO
8 DISCONNECT LINE AT HP VALVE CONTROLLER TO HP OVERPRESSURE SWITCH.
APPLY AIR TO HP OVERPRESSURE SWITCH.
HP VALVE OPERATES?
YES
11 REPLACE HP VALVE CONTROLLER (MM36-11-04).
NO
9 DISCONNECT CONTROL LINE AT HP OVERPRESSURE SWITCH TO HP VALVE.
APPLY AIR TO HP VALVE.
HP VALVE OPERATES?
YES
12 REPLACE HP OVERPRESSURE SWITCH (MM36-11-44).
NO
13 REPLACE HP VALVE (MM36-11-01).

M1-0004-36-5057

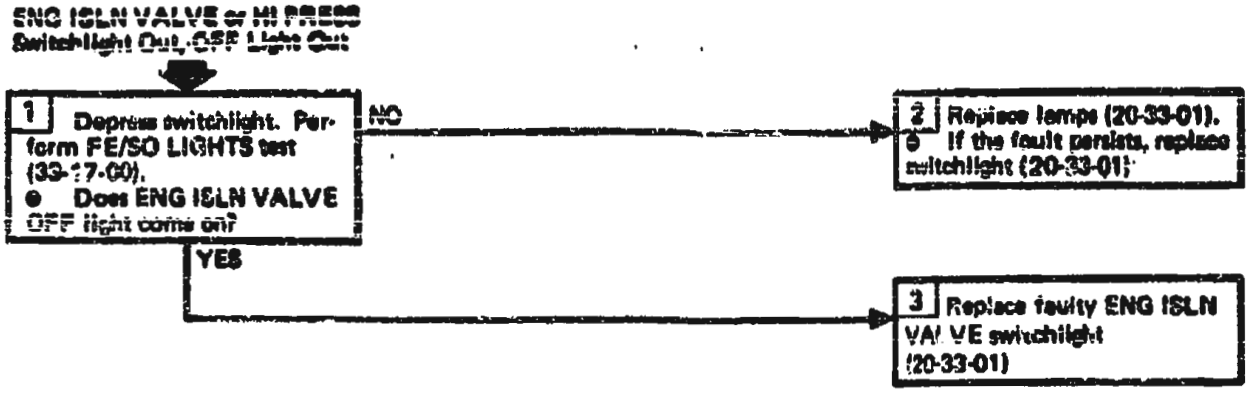
R HI PRESS Flowbar Out, Switchlight Depressed, Engine At Idle
R Figure 108 (Sheet 3)


HI PRESS switchlight released, flowbar on
1 With HI PRESS switchlight released, in FESC, remove HI PRESS OVERHEAT LOCKOUT relay 3811-K4, K5 or K6. Check for 28V dc from relay socket pin C2 to ground.
• Is voltage present?
NO
3 Replace HI PRESS switchlight (20-33-01)
YES
2 Open engine right cowling door. Remove plug from HP controller. Check for 28V dc between plug pins 1 and 2.
• Is voltage present?
YES
4 Replace HP controller (36-11-04)
NO
5 Repair wiring (WDM 36-11-01, -02, or -03)

PREREQUISITES
Electrical Power (24-00-00), Pneumatic Power (36-00-00)
CB's in: 1G10, 11, 12, 13, 14, 15; 2H9; 2D22; 3G12

M1-0100-36-5082

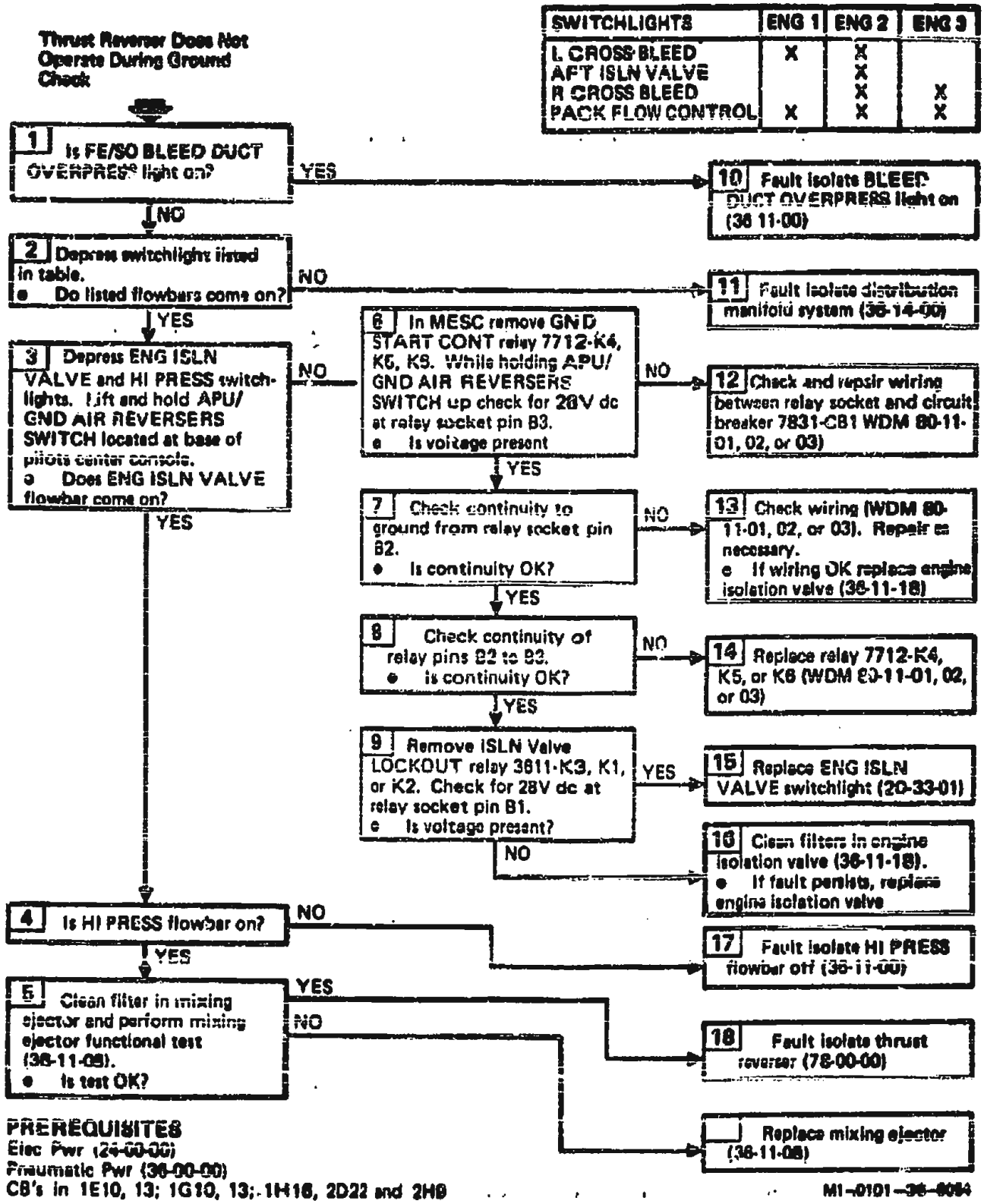
HI PRESS Switchlight Released, Flowbar On
Figure 109


ENG ISLN VALVE or HI PRESS Switchlight Out, OFF Light Out
1 Depress switchlight. Perform FE/SO LIGHTS test (33-17-00).
● Does ENG ISLN VALVE OFF light come on?
NO
2 Replace lamps (20-33-01).
● If the fault persists, replace switchlight (20-33-01)
YES
3 Replace faulty ENG ISLN VALVE switchlight (20-33-01)

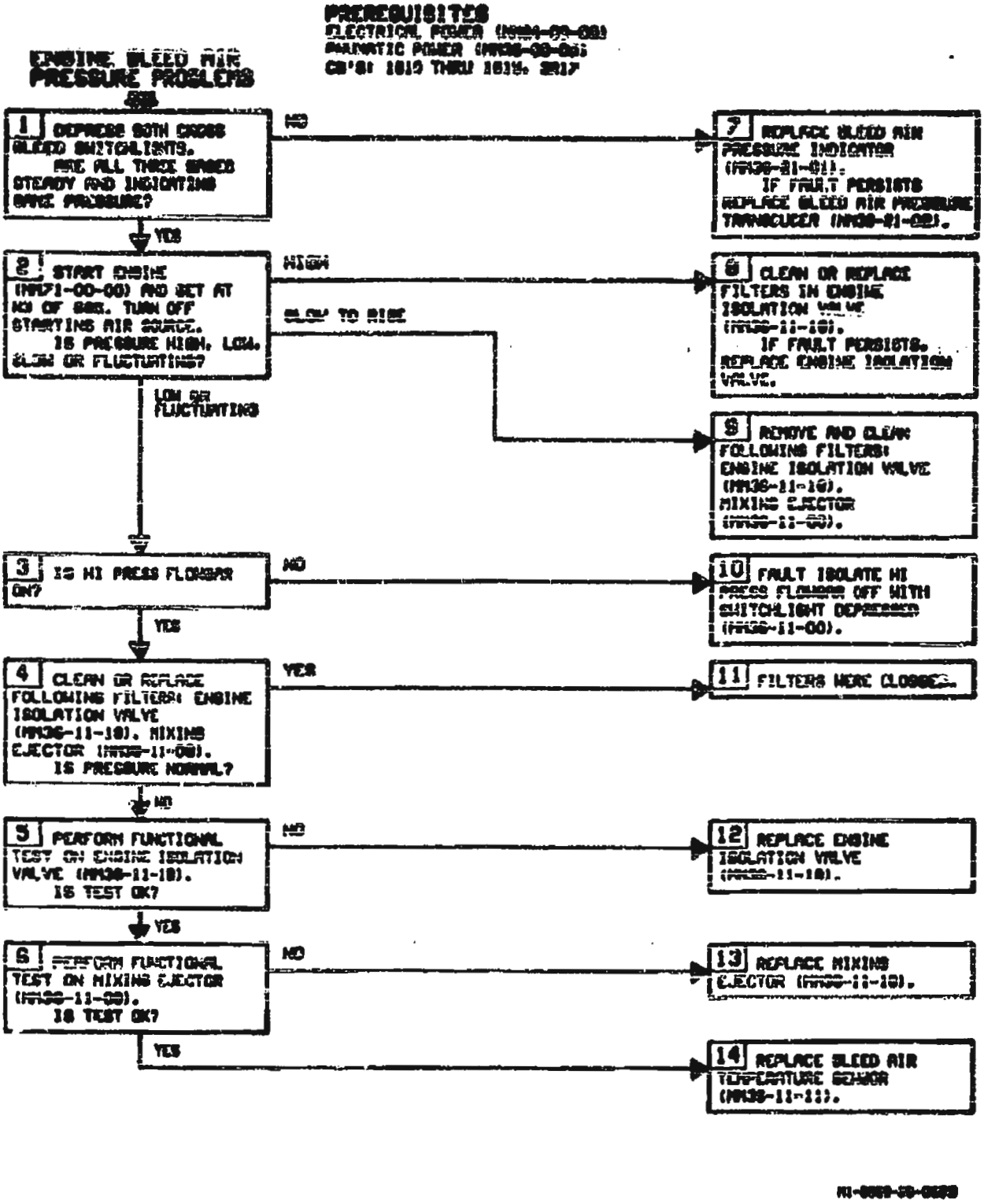
PREREQUISITES
Electrical Power (24-00-00)
CB's in: 1G10, G11, G12

M1-0101-36-8044

ENG ISLN VALVE Or HI PRESS Switchlight Released, OFF Light Out
Figure 110

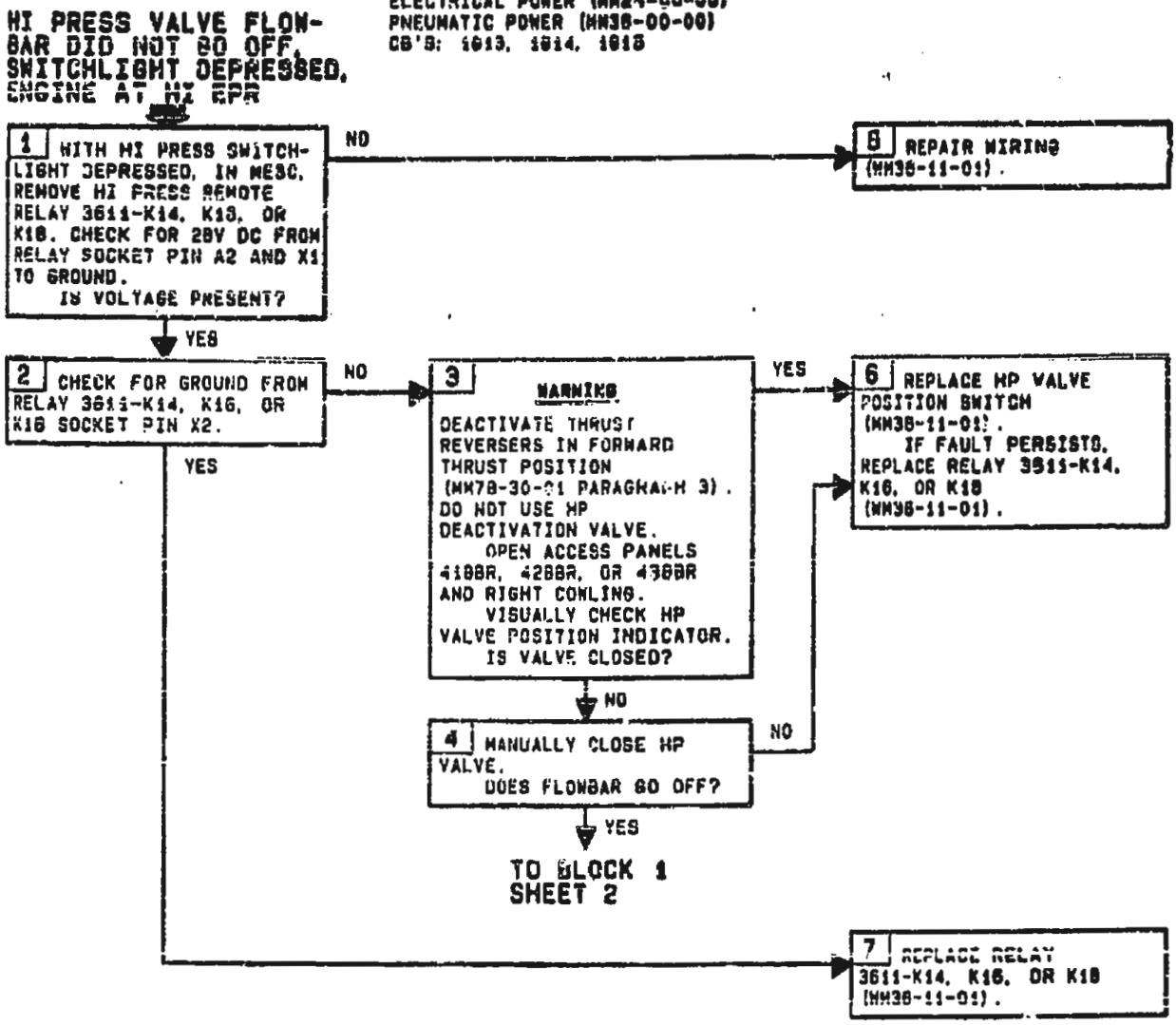

Thrust Reverser Does Not Operate During Ground Check
SWITCHLIGHTS | ENG 1 | ENG 2 | ENG 3
L CROSS BLEED | X | X |
AFT ISLN VALVE | | X |
R CROSS BLEED | | X | X
PACK FLOW CONTROL | X | X | X
1 Is FE/SO BLEED DUCT OVERPRESS light on?
YES
10 Fault isolate BLEED DUCT OVERPRESS light on (36 11-00)
NO
2 Depress switchlight listed in table.
• Do listed flowbars come on?
NO
11 Fault isolate distribution manifold system (36-14-00)
YES
3 Depress ENG ISLN VALVE and HI PRESS switchlights. Lift and hold APU/GND AIR REVERSERS SWITCH located at base of pilots center console.
• Does ENG ISLN VALVE flowbar come on?
NO
6 In MESC remove GND START CONT relay 7712-K4, K5, K6. While holding APU/GND AIR REVERSERS SWITCH up check for 28V dc at relay socket pin B3.
• Is voltage present
NO
12 Check and repair wiring between relay socket and circuit breaker 7831-CB1 WDM 80-11-01, 02, or 03)
YES
7 Check continuity to ground from relay socket pin B2.
• Is continuity OK?
NO
13 Check wiring (WDM 80-11-01, 02, or 03). Repair as necessary.
• If wiring OK replace engine isolation valve (36-11-18)
YES
8 Check continuity of relay pins B2 to B3.
• Is continuity OK?
NO
14 Replace relay 7712-K4, K5, or K6 (WDM 80-11-01, 02, or 03)
YES
9 Remove ISLN Valve LOCKOUT relay 3611-K3, K1, or K2. Check for 28V dc at relay socket pin B1.
• Is voltage present?
YES
15 Replace ENG ISLN VALVE switchlight (20-33-01)
NO
16 Clean filters in engine isolation valve (36-11-18).
• If fault persists, replace engine isolation valve
4 Is HI PRESS flowbar on?
NO
17 Fault isolate HI PRESS flowbar off (36-11-00)
YES
5 Clean filter in mixing ejector and perform mixing ejector functional test (36-11-08).
• Is test OK?
YES
18 Fault isolate thrust reverser (78-00-00)
NO
Replace mixing ejector (36-11-08)
PREREQUISITES
Elec Pwr (24-00-00)
Pneumatic Pwr (36-00-00)
CB's in 1E10, 13; 1G10, 13; 1H16, 2D22 and 2H9
M1-0101-36-8084

Thrust Reverser Does Not Operate During Ground Check
Figure 111


PREREQUISITES
ELECTRICAL POWER
PNEUMATIC POWER
CB'S: 1813 THRU 1815, 2117
ENGINE BLEED AIR PRESSURE PROBLEMS
1 DEPRESS BOTH CROSS BLEED SWITCHLIGHTS. ARE ALL THREE AMBER STEADY AND INDICATING AMBER PRESSURE?
NO
YES
7 REPLACE BLEED AIR PRESSURE INDICATOR (). IF FAULT PERSISTS REPLACE BLEED AIR PRESSURE TRANSDUCER ().
2 START ENGINE () AND SET AT NO OF 60%. TURN OFF STARTING AIR SOURCE. IS PRESSURE HIGH, LOW, SLOW OR FLUCTUATING?
HIGH
SLOW TO RISE
LOW OR FLUCTUATING
6 CLEAN OR REPLACE FILTERS IN ENGINE ISOLATION VALVE (). IF FAULT PERSISTS, REPLACE ENGINE ISOLATION VALVE.
8 REMOVE AND CLEAN FOLLOWING FILTERS: ENGINE ISOLATION VALVE (). MIXING EJECTOR ().
3 IS HI PRESS FLOWBAR ON?
NO
YES
10 FAULT ISOLATE HI PRESS FLOWBAR OFF WITH SWITCHLIGHT DEPRESSED ().
4 CLEAN OR REPLACE FOLLOWING FILTERS: ENGINE ISOLATION VALVE (). MIXING EJECTOR (). IS PRESSURE NORMAL?
YES
11 FILTERS WERE CLOGGED.
NO
5 PERFORM FUNCTIONAL TEST ON ENGINE ISOLATION VALVE (). IS TEST OK?
NO
12 REPLACE ENGINE ISOLATION VALVE ().
YES
6 PERFORM FUNCTIONAL TEST ON MIXING EJECTOR (). IS TEST OK?
NO
13 REPLACE MIXING EJECTOR ().
YES
14 REPLACE BLEED AIR TEMPERATURE SENSOR ().

Engine Bleed Air Pressure Problems
Figure 112

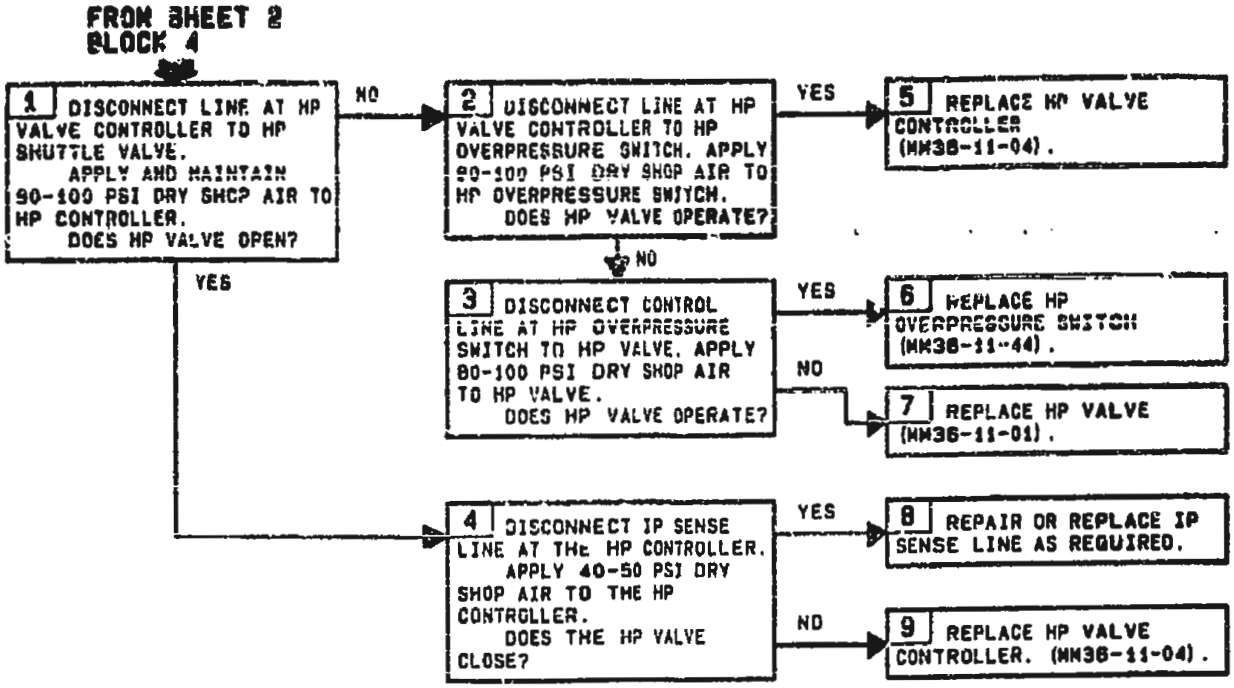
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: 1813, 1814, 1815


HI PRESS VALVE FLOWBAR DID NOT GO OFF, SWITCHLIGHT DEPRESSED, ENGINE AT HI EPR
1 WITH HI PRESS SWITCHLIGHT DEPRESSED, IN MESC, REMOVE HI PRESS REMOTE RELAY 3611-K14, K15, OR K16. CHECK FOR 28V DC FROM RELAY SOCKET PIN A2 AND X1 TO GROUND.
IS VOLTAGE PRESENT?
NO
8 REPAIR WIRING (MM36-11-01).
YES
2 CHECK FOR GROUND FROM RELAY 3611-K14, K16, OR K18 SOCKET PIN X2.
NO
3 WARNING
DEACTIVATE THRUST REVERSERS IN FORWARD THRUST POSITION (MM78-30-01 PARAGRAPH 3).
DO NOT USE HP DEACTIVATION VALVE.
OPEN ACCESS PANELS 418BR, 428BR, OR 438BR AND RIGHT CONLING.
VISUALLY CHECK HP VALVE POSITION INDICATOR.
IS VALVE CLOSED?
YES
6 REPLACE HP VALVE POSITION SWITCH (MM36-11-01).
IF FAULT PERSISTS, REPLACE RELAY 3611-K14, K16, OR K18 (MM36-11-01).
NO
4 MANUALLY CLOSE HP VALVE.
DOES FLOWBAR GO OFF?
NO
YES
TO BLOCK 1 SHEET 2
YES
7 REPLACE RELAY 3611-K14, K16, OR K18 (MM36-11-01).

R HI PRESS Flowbar On, Switchlight Depressed, Engine At High EPR
R Figure 113 (Sheet 1)

R EFFECTIVITY: ALL
R
001B

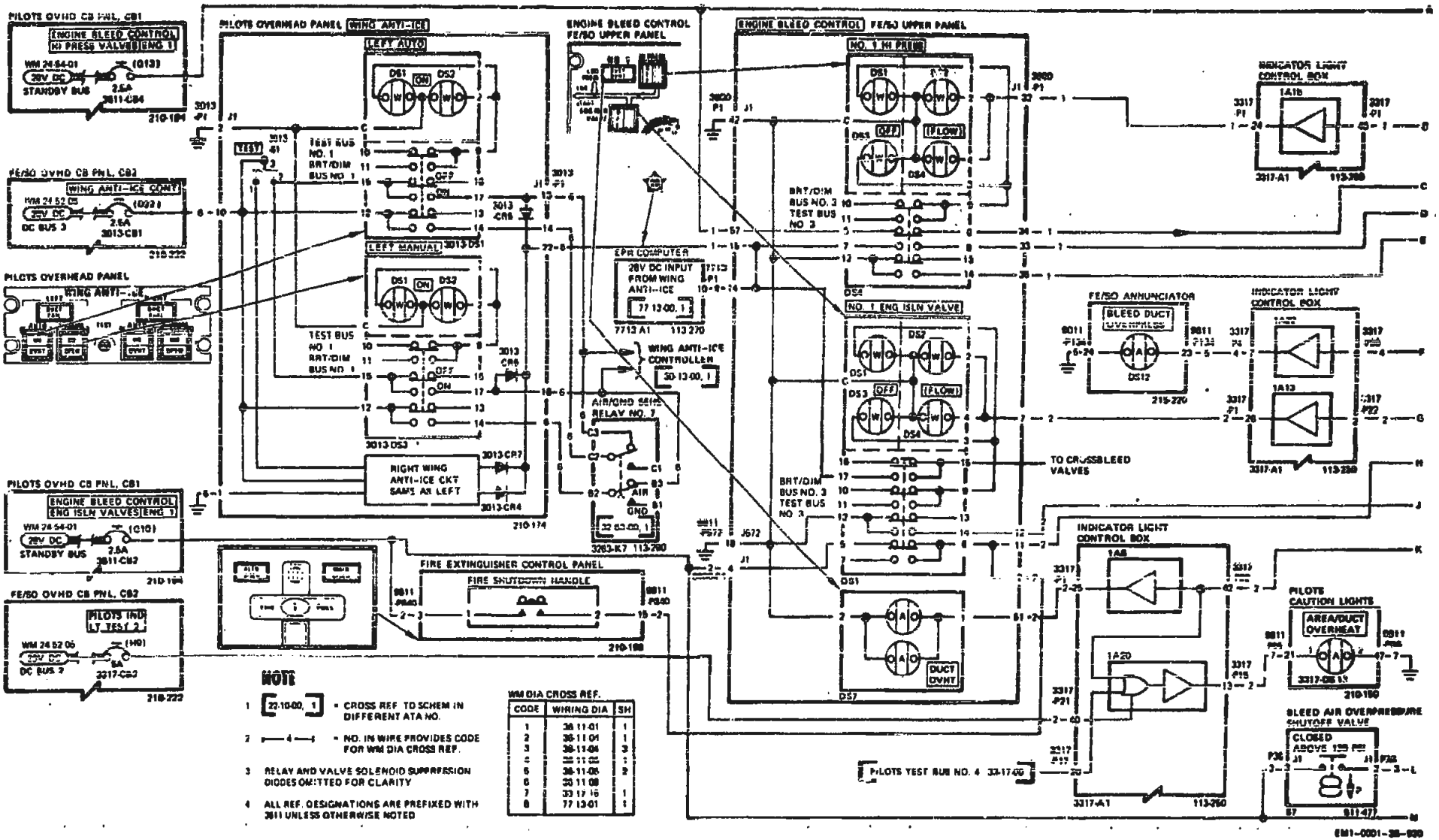
PREREQUISITES
SEE SHEET 1


FROM SHEET 2
BLOCK 4
1 DISCONNECT LINE AT HP VALVE CONTROLLER TO HP SHUTTLE VALVE.
APPLY AND MAINTAIN 90-100 PSI DRY SHOP AIR TO HP CONTROLLER.
DOES HP VALVE OPEN?
NO
2 DISCONNECT LINE AT HP VALVE CONTROLLER TO HP OVERPRESSURE SWITCH. APPLY 80-100 PSI DRY SHOP AIR TO HP OVERPRESSURE SWITCH.
DOES HP VALVE OPERATE?
YES
5 REPLACE HP VALVE CONTROLLER (HM36-11-04).
NO
3 DISCONNECT CONTROL LINE AT HP OVERPRESSURE SWITCH TO HP VALVE. APPLY 80-100 PSI DRY SHOP AIR TO HP VALVE.
DOES HP VALVE OPERATE?
YES
6 REPLACE HP OVERPRESSURE SWITCH (HM36-11-44).
NO
7 REPLACE HP VALVE (HM36-11-01).
YES
4 DISCONNECT IP SENSE LINE AT THE HP CONTROLLER.
APPLY 40-50 PSI DRY SHOP AIR TO THE HP CONTROLLER.
DOES THE HP VALVE CLOSE?
YES
8 REPAIR OR REPLACE IP SENSE LINE AS REQUIRED.
NO
9 REPLACE HP VALVE CONTROLLER. (HM36-11-04).

M1-0000-38-1101

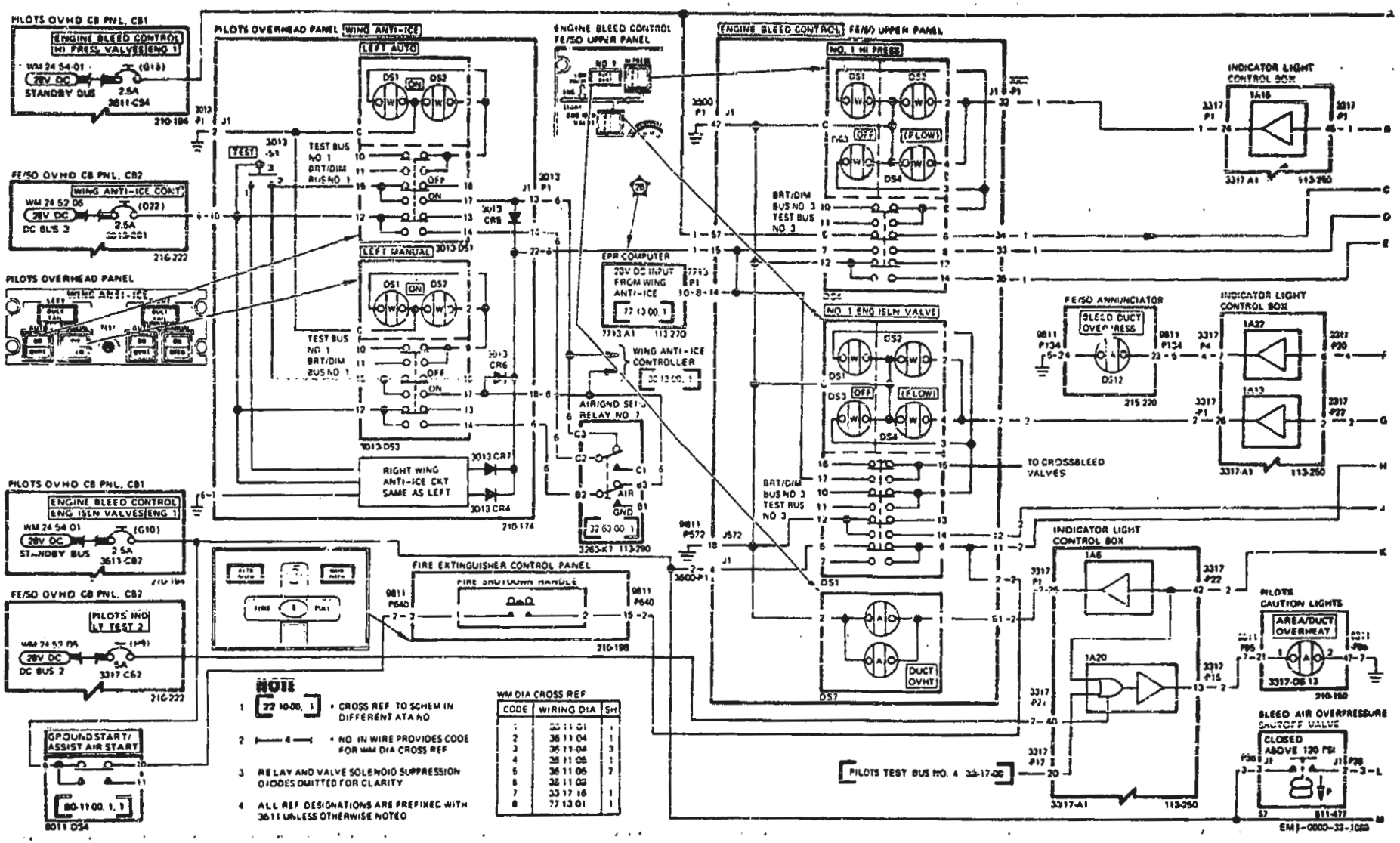
R HI PRESS Flowbar On, Switchlight Depressed, Engine At High EPR
R Figure 113 (Sheet 2)

R EFFECTIVITY: ALL
R
001B



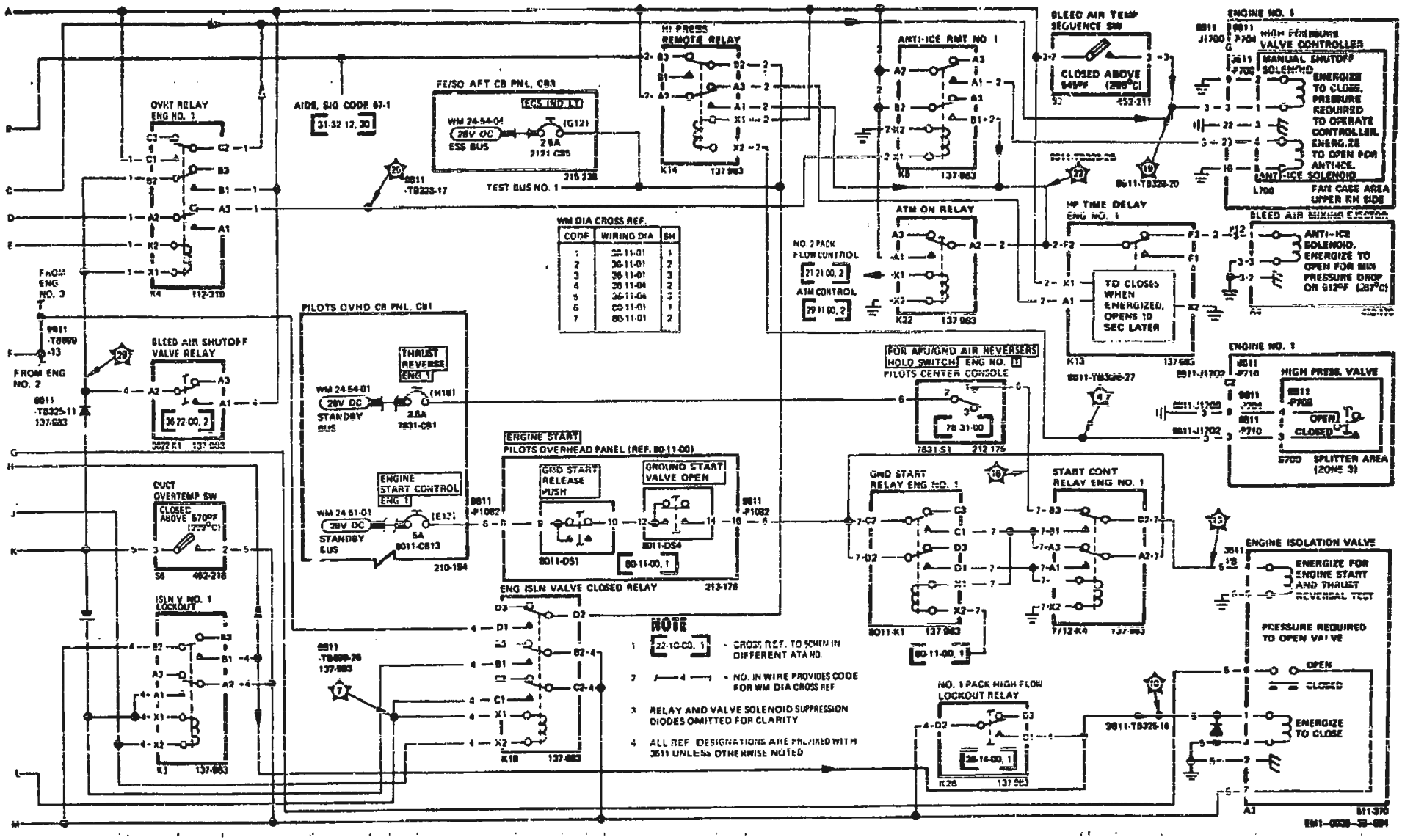
Engine No. 1 Bleed Air Electrical Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: 001, 003-999 WITHOUT SB80-007
R
001B


PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
HI PRESS VALVES (ENG 1)
28V DC
STANDBY BUS
2.5A
FE/SO OVHD CB PNL, CB2
WING ANTI-ICE CONT
DC BUS 3
PILOTS OVERHEAD PANEL
WING ANTI-ICE
PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
ENG ISLN VALVES (ENG 1)
FE/SO OVHD CB PNL, CB2
PILOTS IND LT TEST 2
DC BUS 2
GROUND START/
ASSIST AIR START
PILOTS OVERHEAD PANEL WING ANTI-ICE
LEFT AUTO
LEFT MANUAL
TEST BUS NO 1 BRT/DIM BUS NO 1
RIGHT WING ANTI-ICE CKT SAME AS LEFT
ENGINE BLEED CONTROL FE/SO UPPER PANEL
EPR COMPUTER
28V DC INPUT FROM WING ANTI-ICE
WING ANTI-ICE CONTROLLER
AIR/GND SENSE RELAY NO 7
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO. 1 HI PRESS
NO. 1 ENG ISLN VALVE
BRT/DIM BUS NO 3 TEST BUS NO 3
TO CROSSBLEED VALVES
DUCT OVHT
PILOTS TEST BUS NO. 4
INDICATOR LIGHT CONTROL BOX
1A16
1A22
1A13
1A6
1A20
FE/SO ANNUNCIATOR
BLEED DUCT OVERPRESS
DS12
PILOTS CAUTION LIGHTS
AREA/DUCT OVERHEAT
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
NOTE
1 CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED
WM DIA CROSS REF
CODE | WIRING DIA | SH
1 | 36 11 01 | 1
2 | 36 11 04 | 1
3 | 36 11 04 | 3
4 | 36 11 05 | 1
5 | 36 11 06 | 7
6 | 36 11 08 | 1
7 | 33 17 16 | 1
8 | 77 13 01 | 1

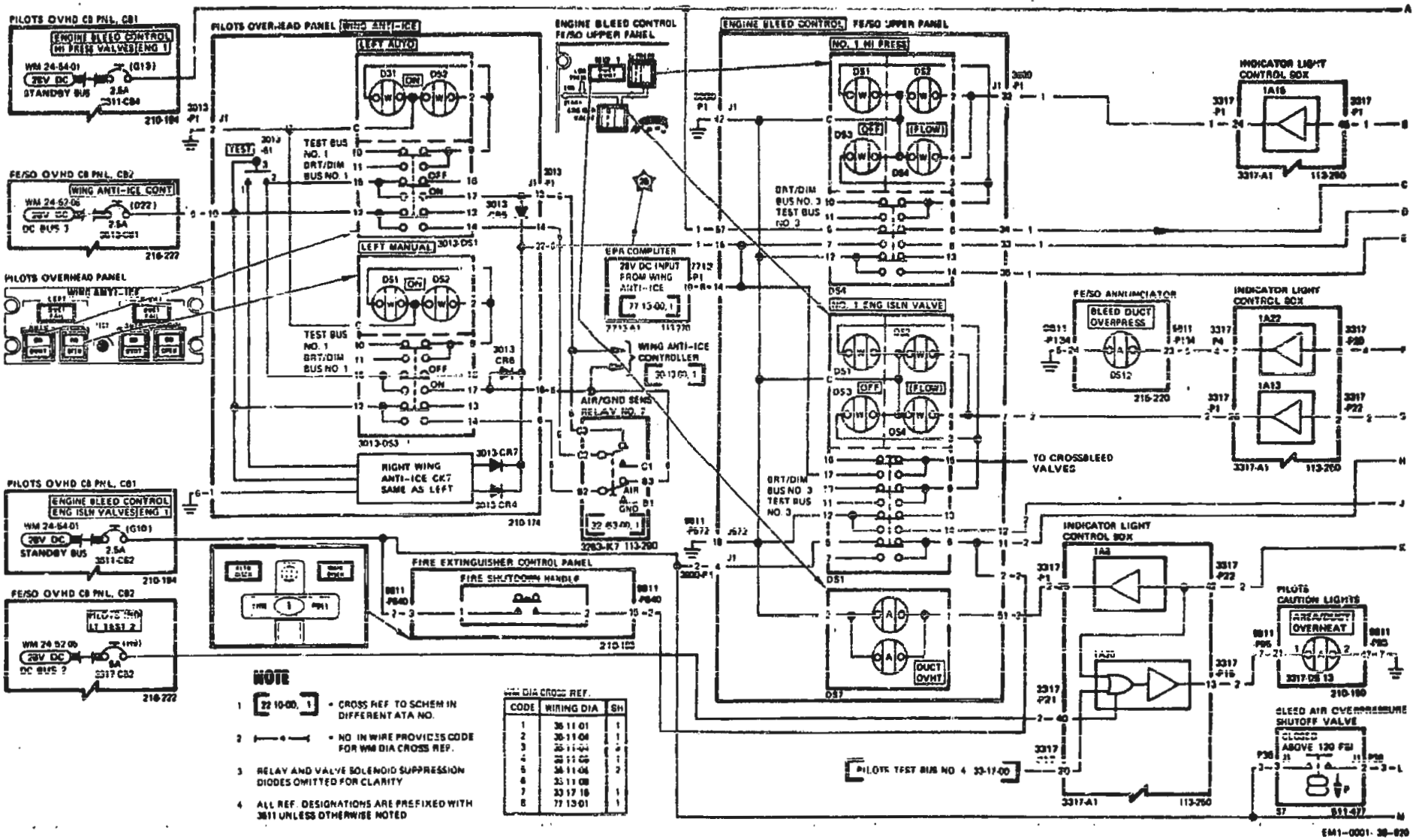
R Engine No. 1 Bleed Air Electrical Schematic
R SCHEM 1 (Sheet 1).

EFFECTIVITY: 001, 003-999 WITH SB80-007


OVHT RELAY ENG NO. 1
AIDS, SIG CODE 67-1
FE/SO AFT CB PNL, CB3
ECS IND LT
WM 24-54-04
28V DC
ESS BUS
2.5A
2131 CB5
TEST BUS NO. 1
HI PRESS REMOTE RELAY
ANTI-ICE RMT NO 1
BLEED AIR TEMP SEQUENCE SW
CLOSED ABOVE 540°F (282°C)
ENGINE NO. 1
HIGH PRESSURE VALVE CONTROLLER
MANUAL SHUTOFF SOLENOID
ENERGIZE TO CLOSE. PRESSURE REQUIRED TO OPERATE CONTROLLER.
ENERG. TO OPEN FOR ANTI-ICE.
ANTI-ICE SOLENOID
FAN CASE AREA UPPER RH SIDE
WM DIA CROSS REF.
CODE
WIRING DIA
SH
NO. 2 PACK FLOW CONTROL
ATM CONTROL
ATM ON RELAY
HP TIME DELAY ENG NO. 1
TD CLOSES WHEN ENERGIZED, OPENS 10 SEC LATER
BLEED AIR MIXING VALVE
ANTI-ICE SOLENOID. ENERGIZE TO OPEN FOR MIN PRESSURE DROP OR 612°F (267°C)
FROM ENG NO. 3
FROM ENG NO. 2
BLEED AIR SHUTOFF VALVE RELAY
PILOTS OVHD CB PNL, CB1
THRUST REVERSER ENG 1
WM 24-54-01
28V DC
STANDBY BUS
2.5A
ENGINE START CONTROL ENG 1
WM 24 51-01
5A
FOR APU/GND AIR NEVERSERS HOLD SWITCH ENG NO. 1
PILOTS CENTER CONSOLE
ENGINE NO. 1
HIGH PRESS. VALVE
OPEN
CLOSED
SPLITTER AREA (ZONE 3)
ENGINE START
PILOTS OVERHEAD PANEL (REF. 80-11-00)
GRD START RELEASE PUSH
GROUND START VALVE OPEN
ENG ISLN VALVE CLOSED RELAY
GND START RELAY ENG NO. 1
START CONT RELAY ENG NO. 1
ENGINE ISOLATION VALVE
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST
PRESSURE REQUIRED TO OPEN VALVE
OPEN
CLOSED
ENERGIZE TO CLOSE
CUCT OVERTEMP SW
CLOSED ABOVE 570°F (299°C)
ISLN V NO. 1 LOCKOUT
NO. 1 PACK HIGH FLOW LOCKOUT RELAY
NOTE
1 22-10-00, 1 - CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2 —4— - NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED

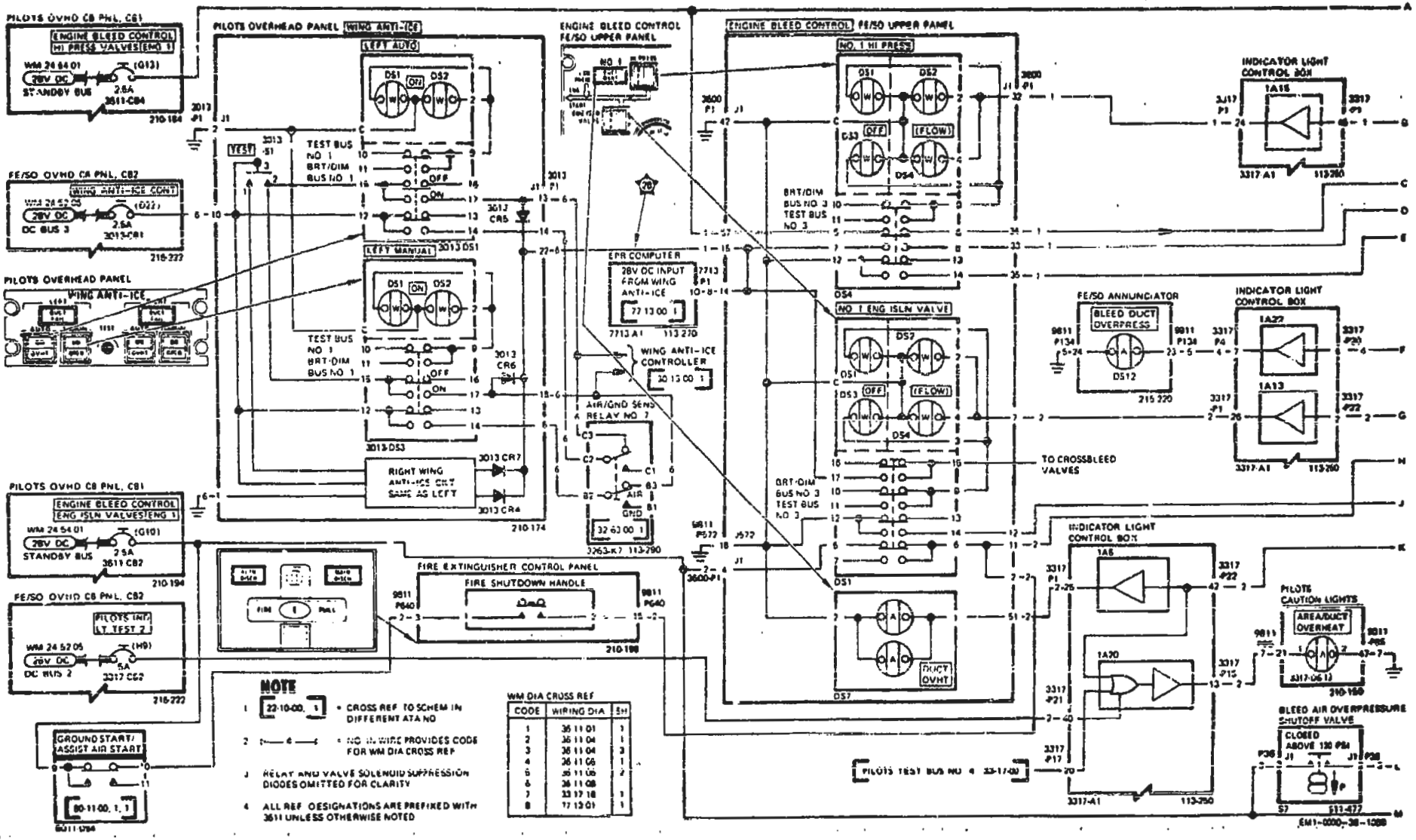
Engine No. 1 Bleed Air Electrical Schematic
SCHEM 1 (Sheet 2)

R EFFECTIVITY: 001, 003-999
R
0010



Engine No. 1 Bleed Air Electrical Schematic
SCHEM 1 (Sheet 1)

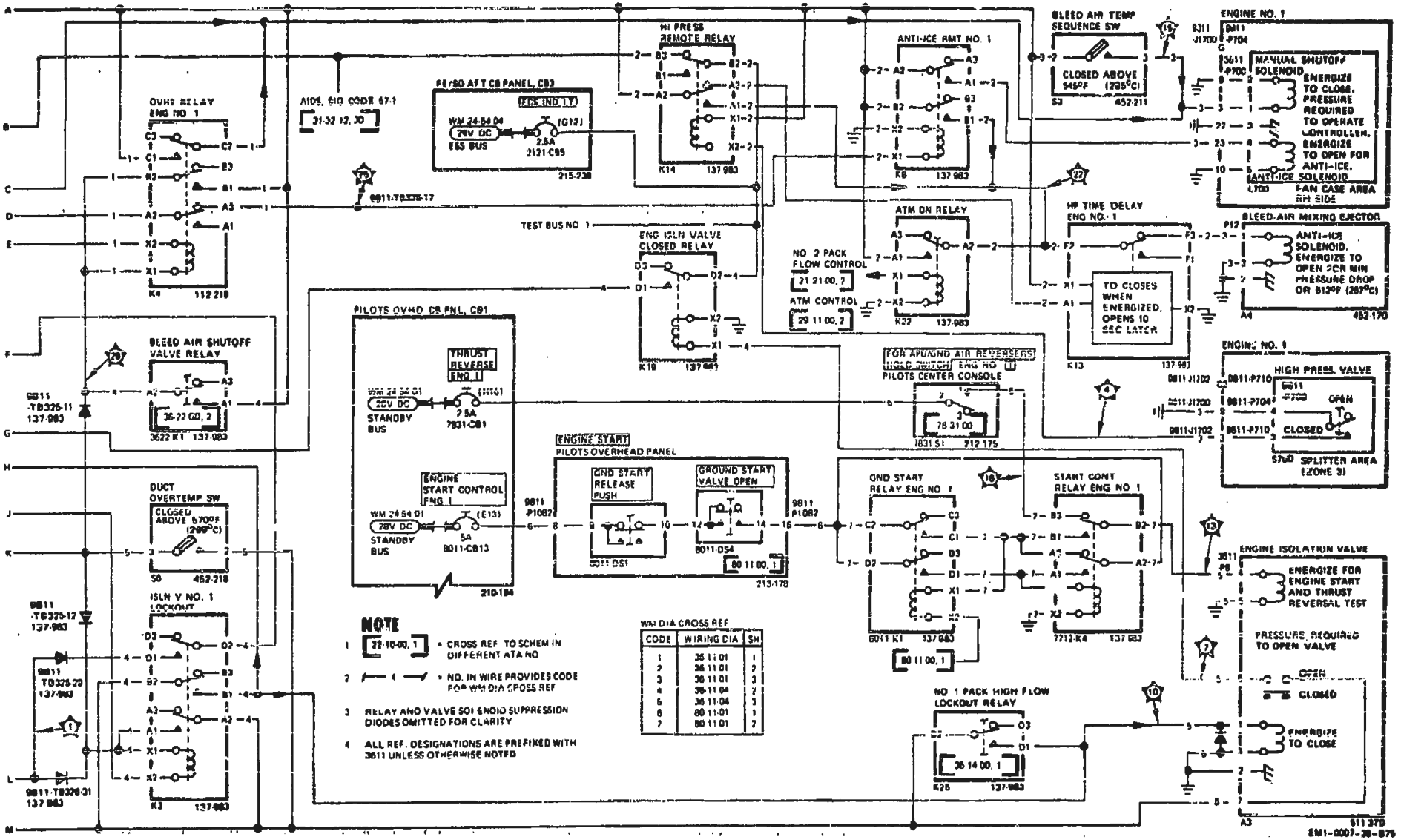
R
R
0018 EFFECTIVITY: 002 WITHOUT SB80-007


PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
HI PRESS VALVES ENG 1
28V DC
STANDBY BUS
2.5A
3611-CB4
210-184
FE/SO OVHD CB PNL, CB2
WING ANTI-ICE CONT
28V DC
DC BUS 3
2.5A
3013-CB1
210-222
PILOTS OVERHEAD PANEL
WING ANTI-ICE
PILOTS OVERHEAD PANEL WING ANTI-ICE
LEFT AUTO
LEFT MANUAL
TEST
TEST BUS NO 1 BRT/DIM BUS NO 1
RIGHT WING ANTI-ICE CKT SAME AS LEFT
210-174
ENGINE BLEED CONTROL FE/SO UPPER PANEL
EPR COMPUTER
28V DC INPUT FROM WING ANTI-ICE
WING ANTI-ICE CONTROLLER
AIR/GND SENS RELAY NO 1
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO 1 HI PRESS
NO 1 ENG ISLN VALVE
BRT/DIM BUS NO 3 TEST BUS NO 3
TO CROSSBLEED VALVES
FE/SO ANNUNCIATOR
BLEED DUCT OVERPRESS
INDICATOR LIGHT CONTROL BOX
PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
ENG ISLN VALVES ENG 1
28V DC
STANDBY BUS
2.5A
3611 CB2
210-194
FE/SO OVHD CB PNL, CB2
PILOTS INT/LT TEST 2
28V DC
DC BUS 2
5A
3317 CB2
210-222
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
210-198
GROUND START/ ASSIST AIR START
PILOTS TEST BUS NO 4 33-17-00
PILOTS CAUTION LIGHTS
AREA/DUCT OVERHEAT
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
NOTE
1 22-10-00, 1 • CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 • NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED
WM DIA CROSS REF
CODE | WIRING DIA | SH
1 | 36 11 01 | 3
2 | 36 11 04 | 1
3 | 36 11 04 | 3
4 | 36 11 06 | 1
5 | 36 11 06 | 2
6 | 36 11 08 | 1
7 | 33 17 18 | 3
8 | 77 13 01 | 1

R Engine No. 1 Bleed Air Electrical Schematic
R SCHEM 1 (Sheet 1)

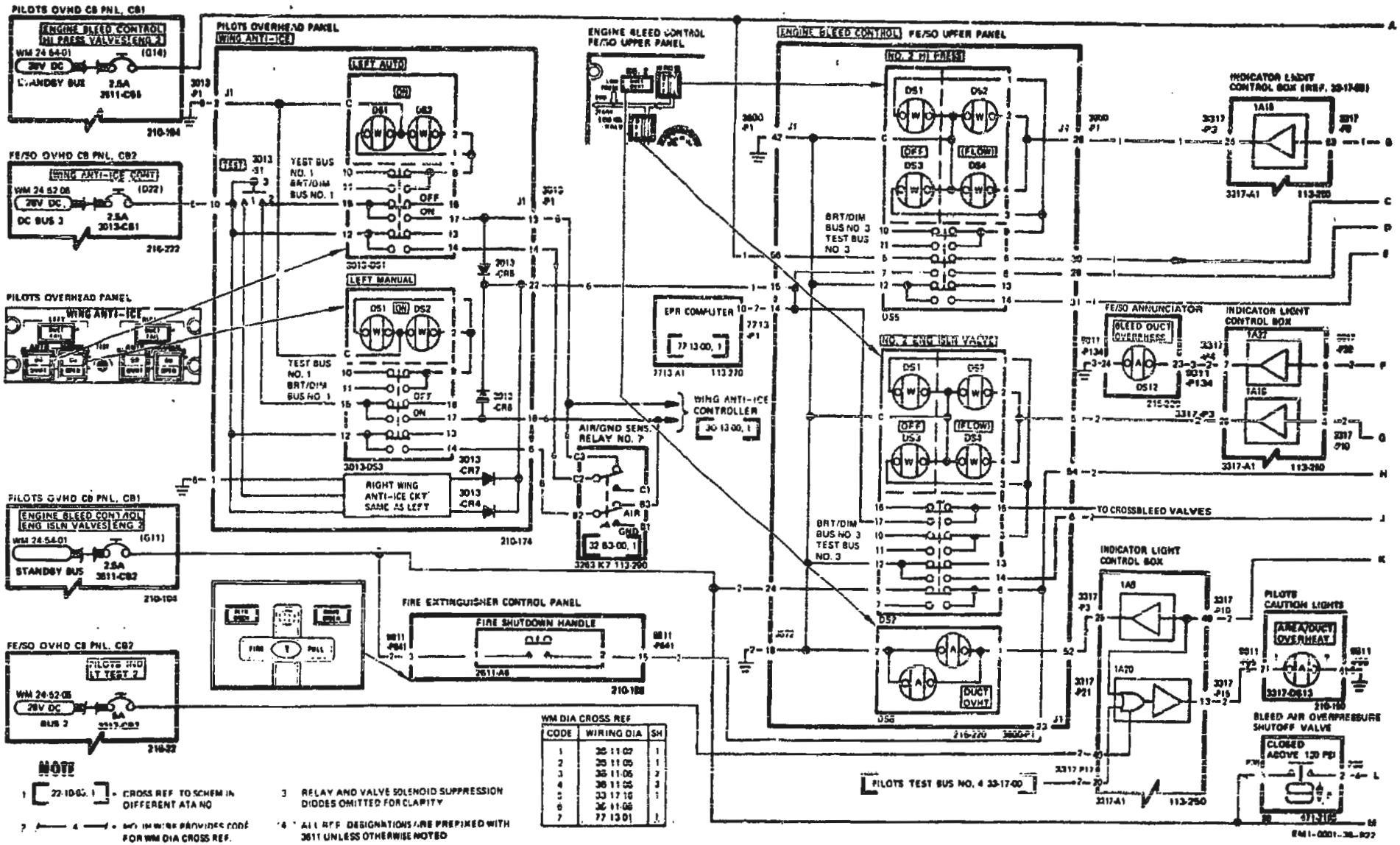
EFFECTIVITY: 002 WITH SB80-007

001B


OVHD RELAY ENG NO 1
K4 112 210
AIDS, SIG CODE 67-1
21-32 12, 30
FE/SO AFT CB PANEL, CB3
ESS IND LT
WM 24-54 04
28V DC ESS BUS
2.5A
2121-CB5
215-238
HI PRESS REMOTE RELAY
K14 137 983
ANTI-ICE RMT NO. 1
K8 137 983
BLEED AIR TEMP SEQUENCE SW
CLOSED ABOVE 545°F (285°C)
S3 452-211
ENGINE NO. 1
MANUAL SHUTOFF SOLENOID
ENERGIZE TO CLOSE. PRESSURE REQUIRED TO OPERATE CONTROLLER.
ENERGIZE TO OPEN FOR ANTI-ICE.
ANTI-ICE SOLENOID
FAN CASE AREA RH SIDE
TEST BUS NO 1
ENG ISLN VALVE CLOSED RELAY
K19 137 981
ATM ON RELAY
K22 137 983
NO 2 PACK FLOW CONTROL
21 21 00, 2
ATM CONTROL
29 11 00, 2
HP TIME DELAY ENG NO. 1
TD CLOSES WHEN ENERGIZED, OPENS 10 SEC LATER
K13 137 981
BLEED AIR MIXING EJECTOR
ANTI-ICE SOLENOID. ENERGIZE TO OPEN FOR MIN PRESSURE DROP OR 812°F (267°C)
A4 452 170
BLEED AIR SHUTOFF VALVE RELAY
9811-TB325-11 137-983
36-22 00, 2
3622 K1 137-983
PILOTS OVHD CB PNL, CB1
THRUST REVERSE ENG 1
WM 24 54 01
28V DC STANDBY BUS
2.5A
7831-CB1
ENGINE START CONTROL ENG 1
5A
B011-CB13
210-194
FOR APU/GND AIR REVERSERS HOLD SWITCH ENG NO 1
PILOTS CENTER CONSOLE
78 31 00
7831 S1 212 175
ENGINE NO. 1
HIGH PRESS VALVE
OPEN
CLOSED
STUD SPLITTER AREA (ZONE 3)
ENGINE START
PILOTS OVERHEAD PANEL
GND START RELEASE PUSH
GROUND START VALVE OPEN
B011 DS1
B011-DS4
80 11 00, 1
213-178
GND START RELAY ENG NO 1
6041 K1 137 983
START CONT RELAY ENG NO 1
7712-K4 137 983
DUCT OVERTEMP SW
CLOSED ABOVE 670°F (299°C)
S6 452-218
ISLN V NO. 1 LOCKOUT
K3 137-983
ENGINE ISOLATION VALVE
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST
PRESSURE REQUIRED TO OPEN VALVE
OPEN
CLOSED
ENERGIZE TO CLOSE
A3 511 379
NO 1 PACK HIGH FLOW LOCKOUT RELAY
36 14 00, 1
K28 137-983
NOTE
1 22-10-00, 1 = CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 4 = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3811 UNLESS OTHERWISE NOTED
WM DIA CROSS REF
CODE | WIRING DIA | SH
1 | 35 11 01 | 1
2 | 36 11 01 | 2
3 | 36 11 01 | 3
4 | 36 11 04 | 2
5 | 36 11 04 | 3
6 | 80 11 01 | 1
7 | 80 11 01 | 7
EM1-0007-36-876

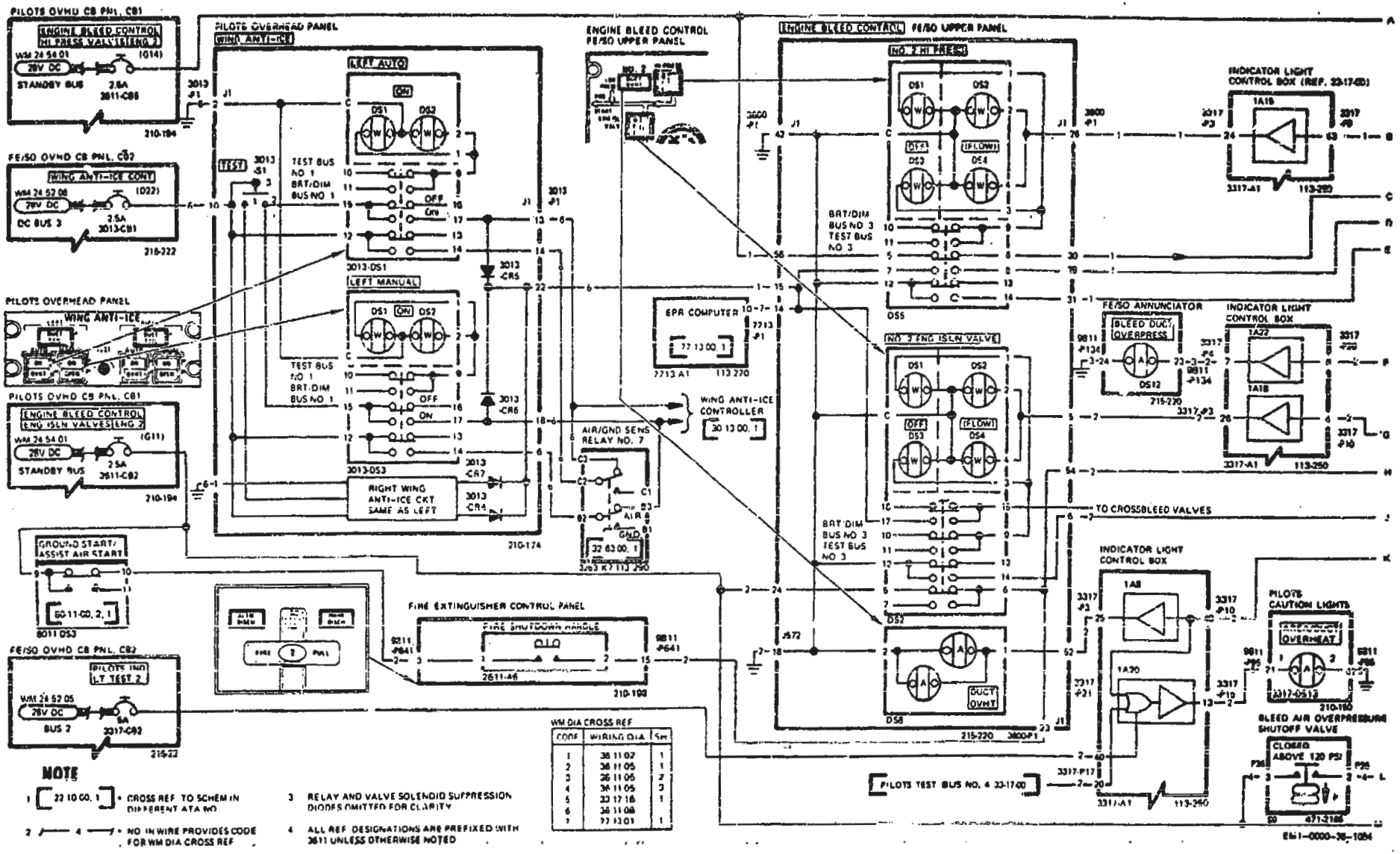
Engine No. 1 Bleed Air Electrical Schematic
SCHEM 1 (Sheet 2)

R EFFECTIVITY: 002
R
001B


PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL HI PRESS VALVES ENG 2
PILOTS OVERHEAD PANEL
WING ANTI-ICE
ENGINE BLEED CONTROL FE/SO UPPER PANEL
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO. 2 HI PRESS
INDICATOR LIGHT CONTROL BOX (REF. 33-17-00)
FE/SO OVHD CB PNL, CB2
WING ANTI-ICE CONT
DC BUS 3
LEFT AUTO
LEFT MANUAL
TEST BUS NO. 1 BRT/DIM BUS NO. 1
BRT/DIM BUS NO 3 TEST BUS NO 3
EPR COMPUTER
WING ANTI-ICE CONTROLLER
AIR/GND SENS. RELAY NO. 7
NO. 2 ENG ISLN VALVE
FE/SO ANNUNCIATOR
BLEED DUCT OVERHEAT
INDICATOR LIGHT CONTROL BOX
RIGHT WING ANTI-ICE CKT SAME AS LEFT
TO CROSSBLEED VALVES
PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL ENG ISLN VALVES ENG 2
STANDBY BUS
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
INDICATOR LIGHT CONTROL BOX
PILOTS CAUTION LIGHTS
AREA/DUCT OVERHEAT
FE/SO OVHD CB PNL, CB2
PILOTS HYD LT TEST 2
BUS 2
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
PILOTS TEST BUS NO. 4 33-17-00
WM DIA CROSS REF
CODE
WIRING DIA
SH
NOTE
CROSS REF TO SCHEM IN DIFFERENT ATA NO
RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
ALL REF DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED

Engine No. 2 Bleed Air Electrical Schematic
SCHEM 2 (Sheet 1)

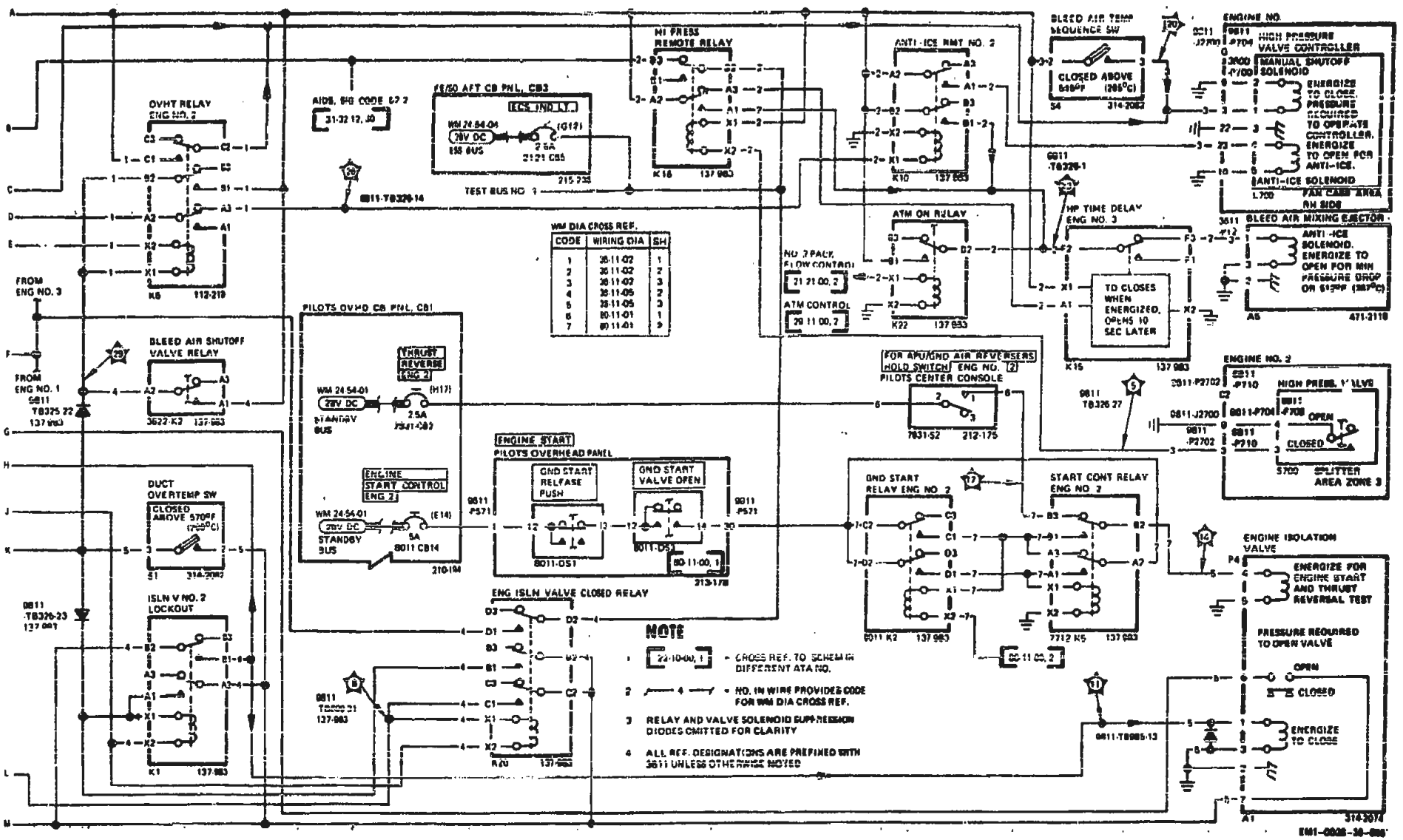
R EFFECTIVITY: 001, 003-999 WITHOUT SB80-007
R
001B


PILOTS OVHD CB PNL. CB1
ENGINE BLEED CONTROL HI PRESS VALVE ENG 2
PILOTS OVERHEAD PANEL
WING ANTI-ICE
ENGINE BLEED CONTROL FE/SO UPPER PANEL
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO. 2 HI PRESS
INDICATOR LIGHT CONTROL BOX (REF. 33-17-00)
FE/SO OVHD CB PNL. CB2
WING ANTI-ICE CONT
LEFT AUTO
LEFT MANUAL
TEST BUS NO 1 BRT/DIM BUS NO 1
BRT/DIM BUS NO 3 TEST BUS NO 3
EPR COMPUTER
WING ANTI-ICE CONTROLLER
AIR/GND SENS RELAY NO. 7
NO. 2 ENG ISLN VALVE
FE/SO ANNUNCIATOR
INDICATOR LIGHT CONTROL BOX
TO CROSSBLEED VALVES
GROUND START/ ASSIST AIR START
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
PILOTS CAUTION LIGHTS
OVERHEAT
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
PILOTS TEST BUS NO. 4 33-17-00
WM DIA CROSS REF
NOTE
1 [22 10 00, 1] = CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 — 4 — = NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED

R Engine No. 2 Bleed Air Electrical Schematic
R SCHEM 2 (Sheet 1)

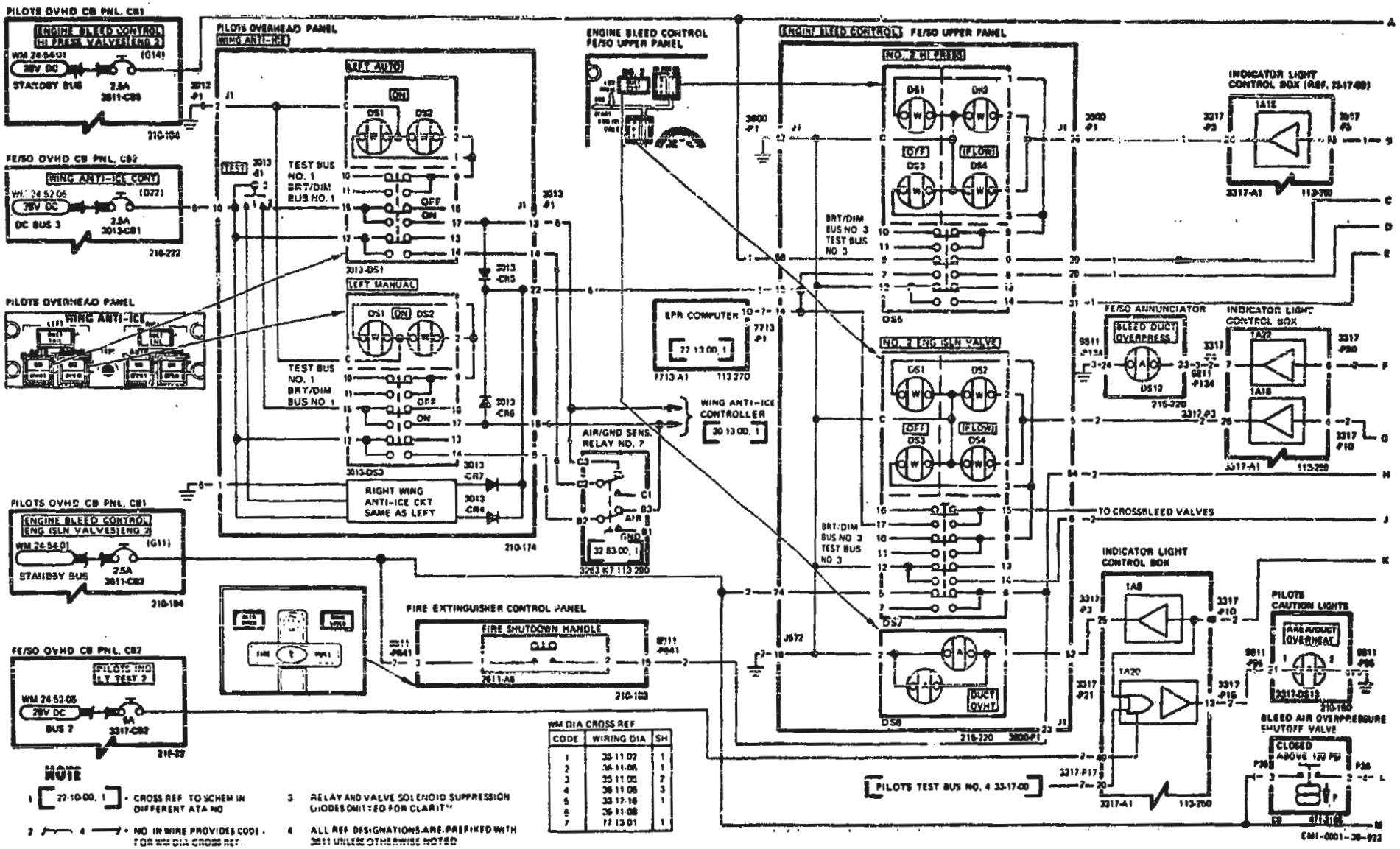
EFFECTIVITY: 001, 003-999 WITH SB80-007

001B


OVHT RELAY ENG NO. 2
AIDS, SIG CODE 67-2
ESSO AFT CB PNL, CB3
ECS IND LT
HI PRESS REMOTE RELAY
ANTI-ICE RMT NO. 2
BLEED AIR TEMP SEQUENCE SW
CLOSED ABOVE 510°F (265°C)
ENGINE NO. 3 HIGH PRESSURE VALVE CONTROLLER
MANUAL SHUTOFF SOLENOID
ENERGIZE TO CLOSE. PRESSURE REQUIRED TO OPERATE CONTROLLER. ENERGIZE TO OPEN FOR ANTI-ICE.
ANTI-ICE SOLENOID
FAN CASE AREA RH SIDE
TEST BUS NO. 1
WM DIA CROSS REF.
CODE | WIRING DIA | SH
1 | 36-11-02 | 1
2 | 36-11-02 | 2
3 | 36-11-02 | 3
4 | 36-11-05 | 2
5 | 36-11-05 | 3
6 | 80-11-01 | 1
7 | 80-11-01 | 3
ATM ON RELAY
NO. 2 PACK FLOW CONTROL
ATM CONTROL
HP TIME DELAY ENG NO. 3
TD CLOSES WHEN ENERGIZED, OPENS 10 SEC LATER
BLEED AIR MIXING EJECTOR
ANTI-ICE SOLENOID. ENERGIZE TO OPEN FOR MIN PRESSURE DROP ON 615°F (323°C)
FROM ENG NO. 3
FROM ENG NO. 1
BLEED AIR SHUTOFF VALVE RELAY
PILOTS OVHD CB PNL, CB1
THRUST REVERSE ENG 2
ENGINE START CONTROL ENG 2
STANDBY BUS
ENGINE START PILOTS OVERHEAD PANEL
GND START RELEASE PUSH
GND START VALVE OPEN
FOR APU/GND AIR REVERSERS HOLD SWITCH ENG NO. 2
PILOTS CENTER CONSOLE
ENGINE NO. 2 HIGH PRESS VALVE
OPEN
CLOSED
SPLITTER AREA ZONE 3
DUCT OVERTEMP SW
CLOSED ABOVE 570°F (299°C)
ISLN V NO. 2 LOCKOUT
ENG ISLN VALVE CLOSED RELAY
GND START RELAY ENG NO. 2
START CONT RELAY ENG NO. 2
ENGINE ISOLATION VALVE
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST
PRESSURE REQUIRED TO OPEN VALVE
OPEN
CLOSED
ENERGIZE TO CLOSE
NOTE
1 [22-10-00, 1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2 —4— = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED

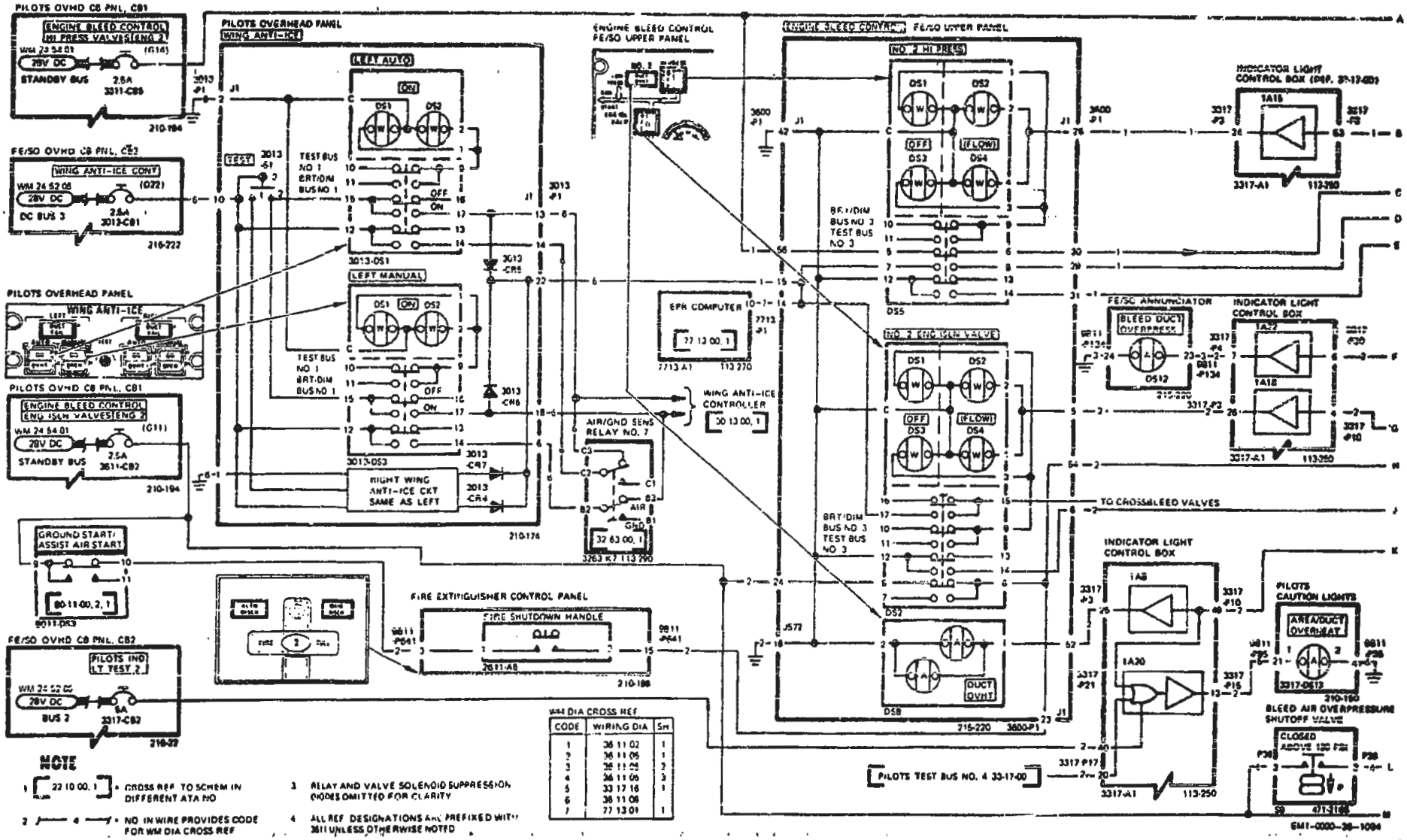
Engine No. 2 Bleed Air Electrical Schematic
SCHEM 2 (Sheet 2)

R EFFECTIVITY: 001, 003-999
R
001B



Engine No. 2 Bleed Air Electrical Schematic
SCHEM 2 (Sheet 1)

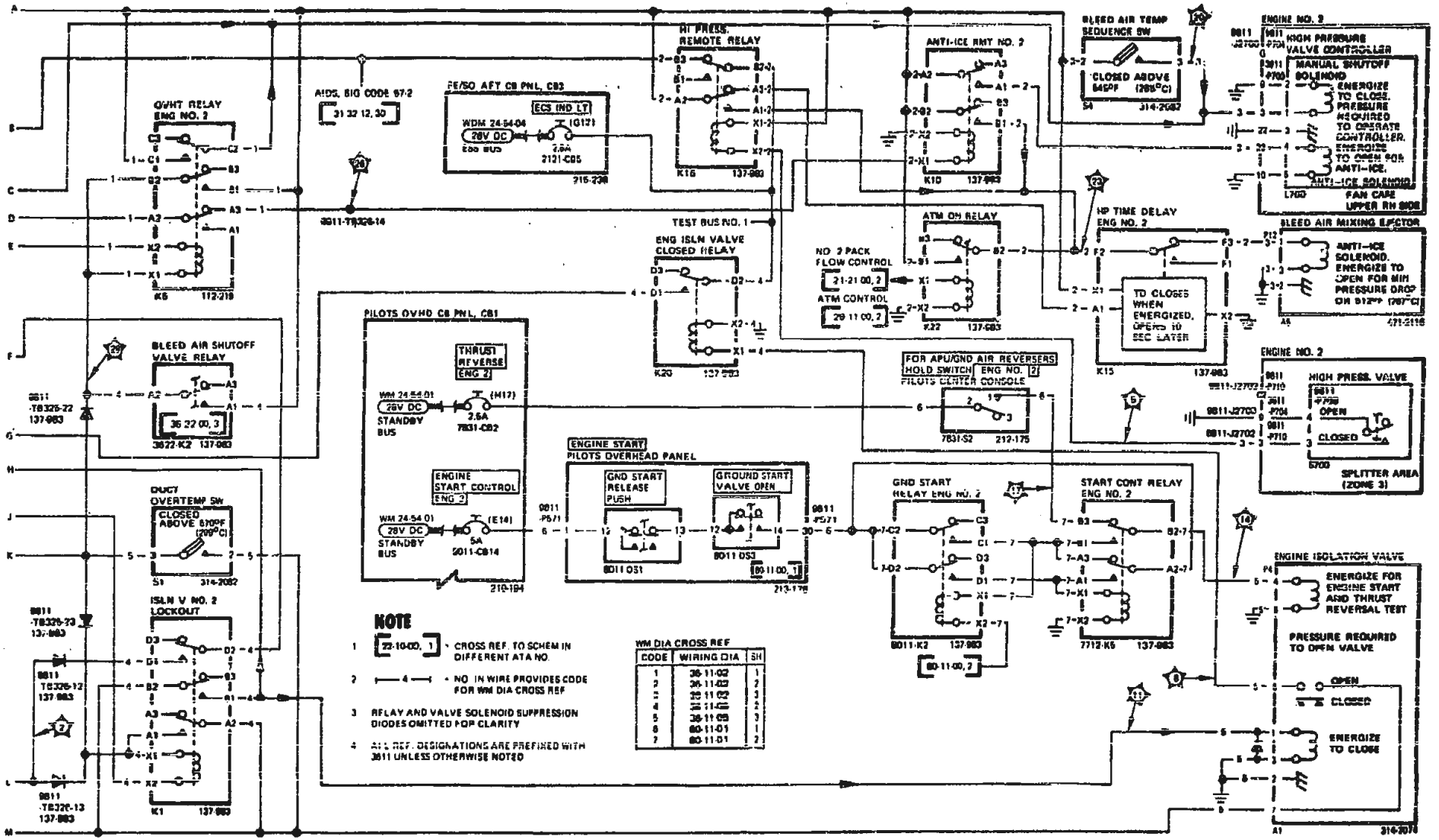
EFFECTIVITY: 002 WITHOUT SB80-007


PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL HI PRESS VALVES ENG 2
28V DC
STANDBY BUS
2.5A 3311-CB5
FE/SO OVHD CB PNL, CB2
WING ANTI-ICE CONT
28V DC
DC BUS 3
2.5A 3013-CB1
PILOTS OVERHEAD PANEL
WING ANTI-ICE
PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL ENG ISLN VALVES ENG 2
28V DC
STANDBY BUS
2.5A 3311-CB2
GROUND START/ ASSIST AIR START
FE/SO OVHD CB PNL, CB2
PILOTS IND LT TEST 2
28V DC
BUS 2
5A 3317-CB2
PILOTS OVERHEAD PANEL
WING ANTI-ICE
LEFT AUTO
LEFT MANUAL
TEST BUS NO 1 BRT/DIM BUS NO 1
RIGHT WING ANTI-ICE CKT SAME AS LEFT
ENGINE BLEED CONTROL FE/SO UPPER PANEL
AIR/GND SENS RELAY NO. 7
WING ANTI-ICE CONTROLLER
EPR COMPUTER
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO. 2 HI PRESS
NO. 2 ENG ISLN VALVE
BRT/DIM BUS NO 3 TEST BUS NO 3
TO CROSSBLEED VALVES
FE/SC ANNUNCIATOR
BLEED DUCT OVERPRESS
INDICATOR LIGHT CONTROL BOX
INDICATOR LIGHT CONTROL BOX (REF. 31-12-00)
PILOTS CAUTION LIGHTS
AREA/DUCT OVERHEAT
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
PILOTS TEST BUS NO. 4 33-17-00
NOTE
1 [22 10 00, 1] = CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 = NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 3011 UNLESS OTHERWISE NOTED
WM DIA CROSS REF
CODE | WIRING DIA | SH
1 | 36 11 02 | 1
2 | 36 11 05 | 1
3 | 36 11 06 | 2
4 | 36 11 06 | 3
5 | 33 17 16 | 1
6 | 36 11 08 | 1
7 | 77 13 01 | 1

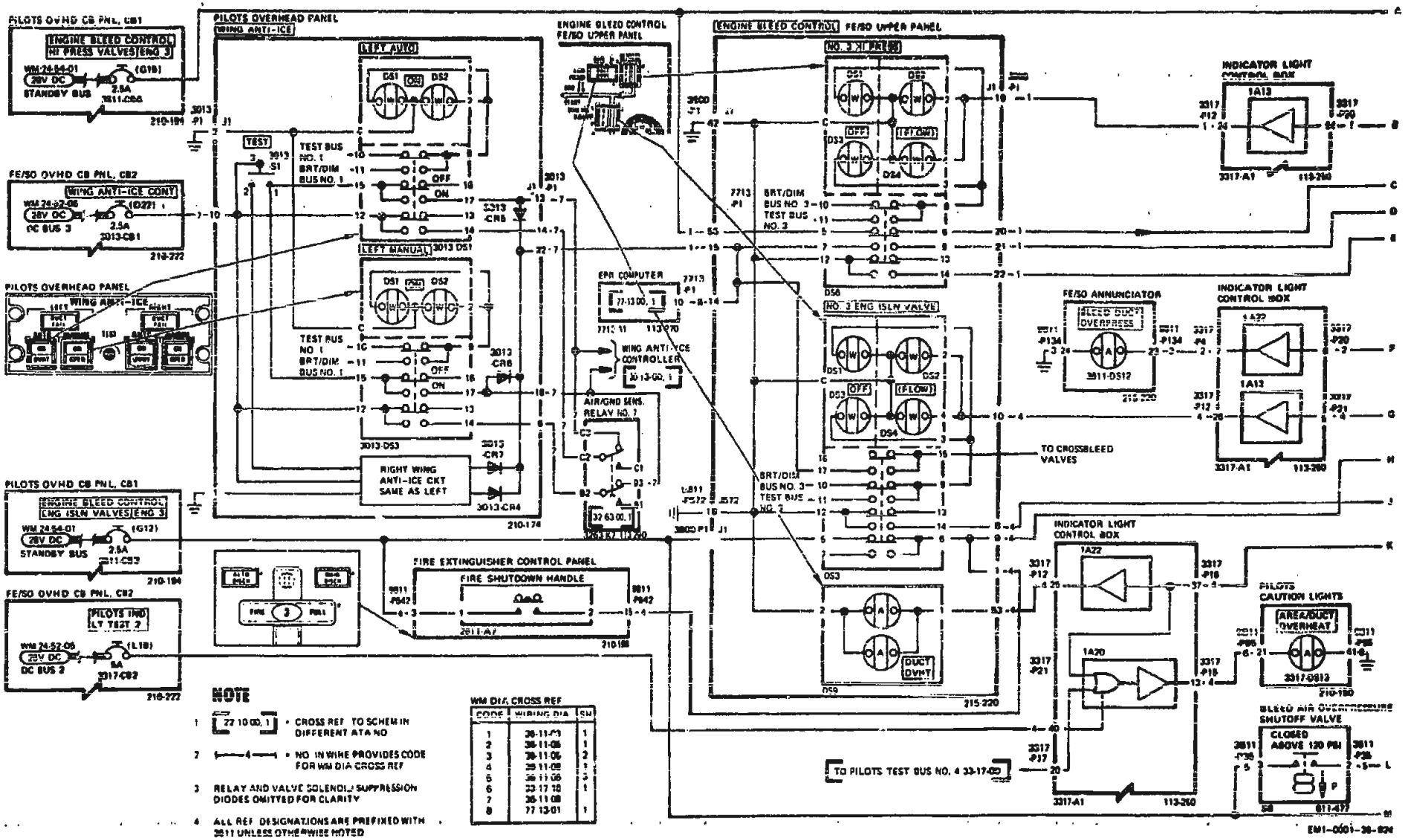
R Engine No. 2 Bleed Air Electrical Schematic
R SCHEM 2 (Sheet 1)

EFFECTIVITY: 002 WITH SB80-007

0015

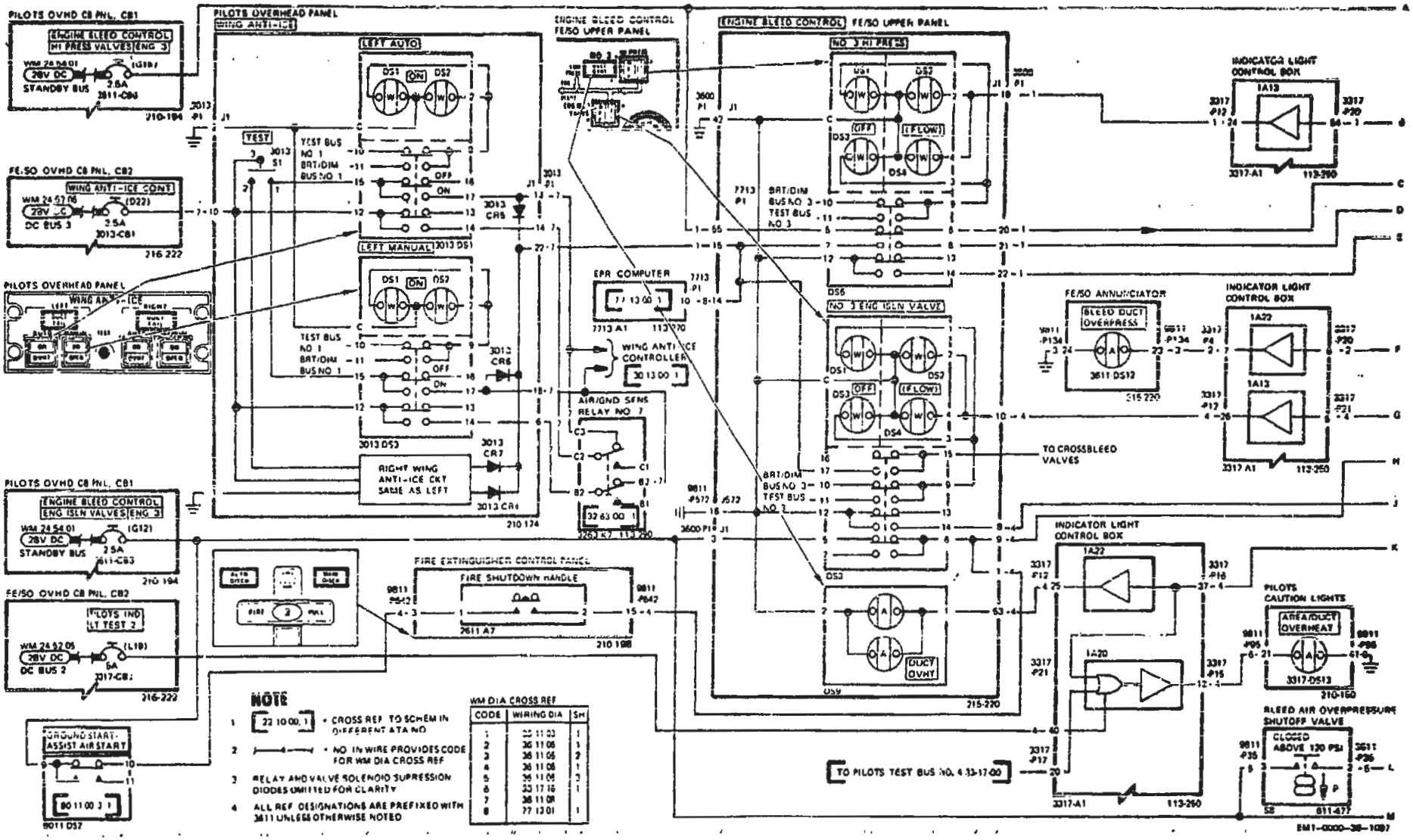


Engine No. 2 Bleed Air Electrical Schematic
SCHEM 2 (Sheet 2)



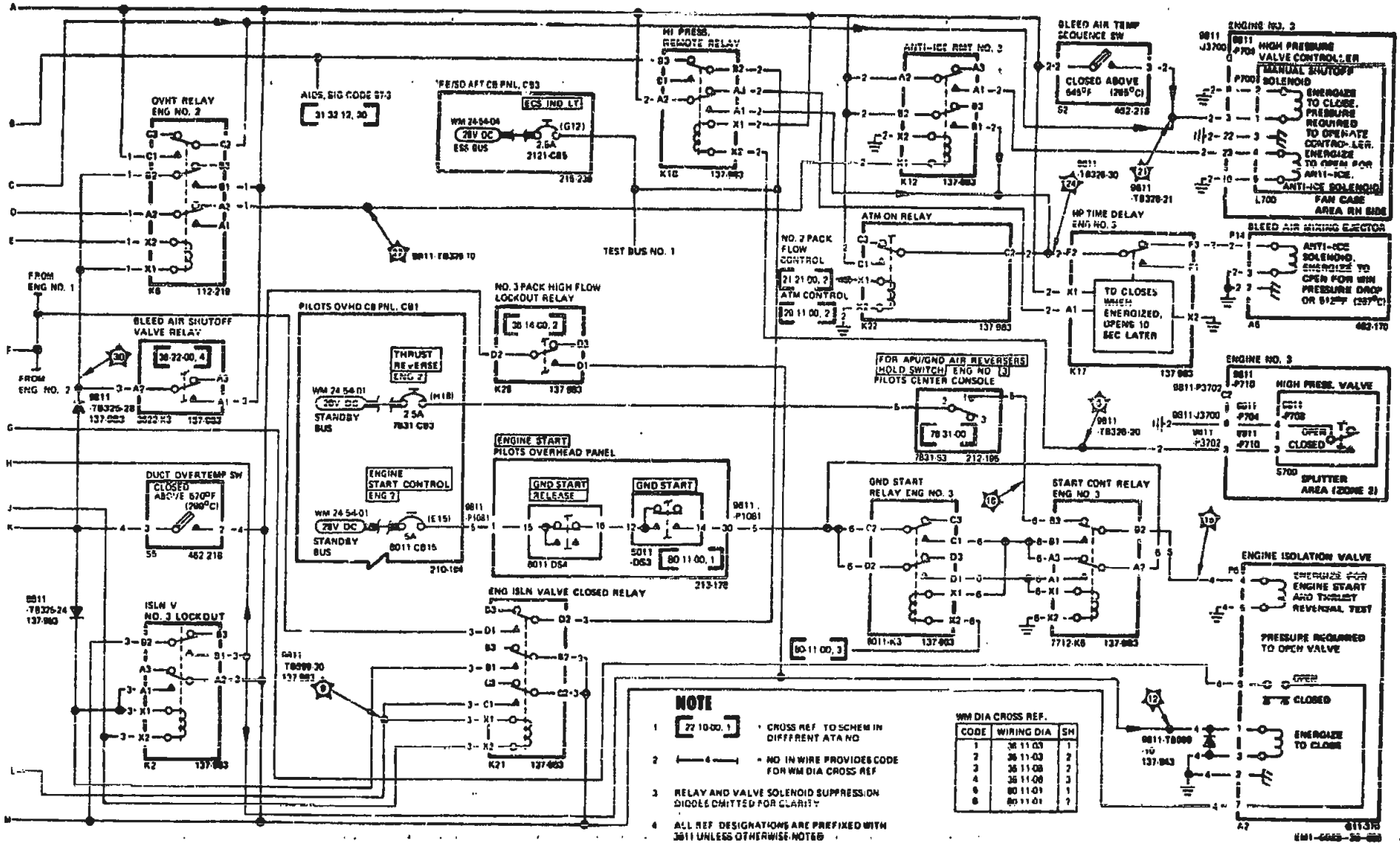
Engine No. 3 Bleed Air Electrical Schematic
SCHEM 3 (Sheet 1)

R
R
U01B EFFECTIVITY: 001, 003-999 WITHOUT SB80-007



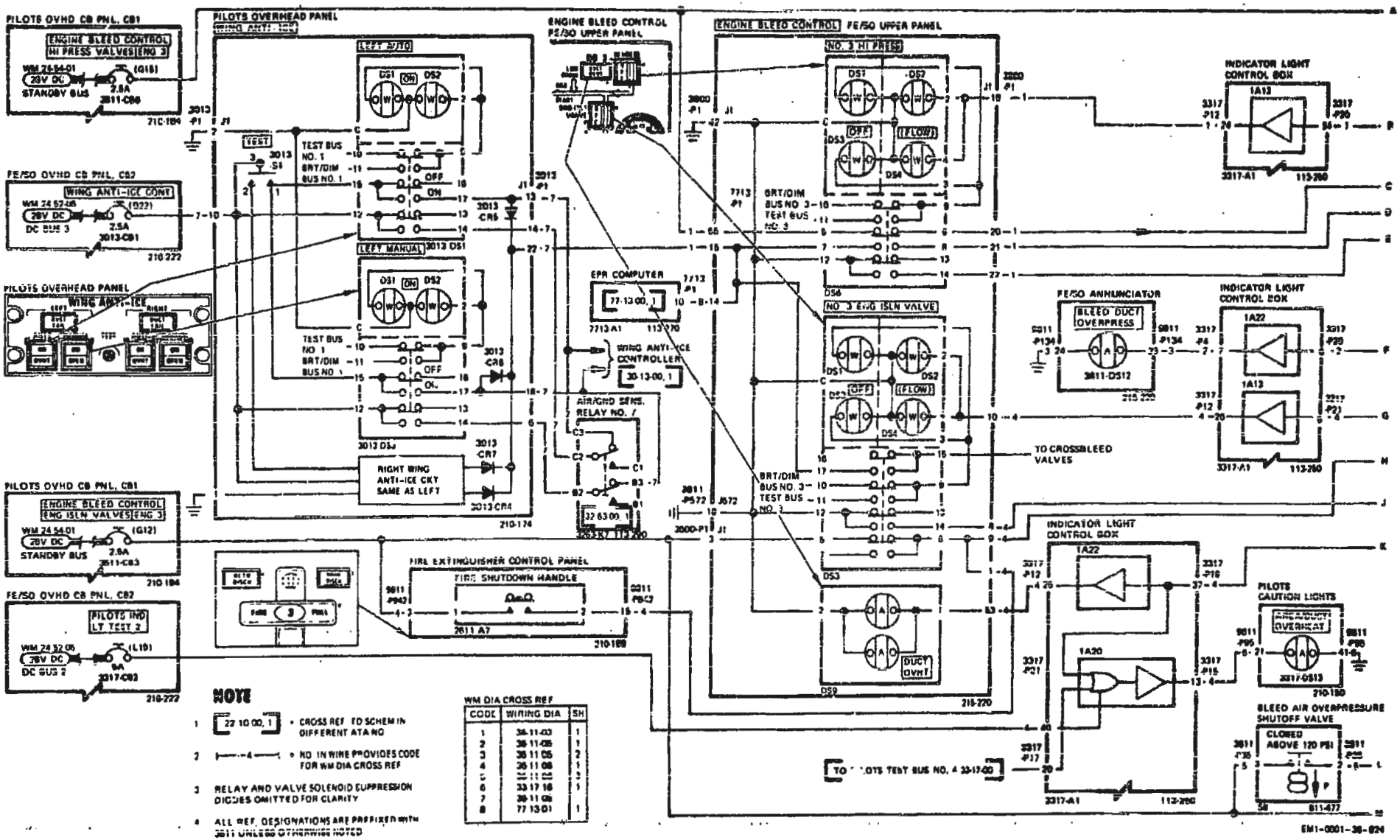
Engine No. 3 Bleed Air Electrical Schematic
SCHEM 3 (Sheet 1)

EFFECTIVITY: 001, 003-999 WITH SB80-007


OVHT RELAY ENG NO. 2
AIDS, SIG CODE 07-3
ECS IND LT
HI PRESS. REMOTE RELAY
ANTI-ICE RLY NO. 3
BLEED AIR TEMP SEQUENCE SW
CLOSED ABOVE 649°F (288°C)
ENGINE NO. 3
HIGH PRESSURE VALVE CONTROLLER
MANUAL SHUTOFF SOLENOID
ENERGIZE TO CLOSE. PRESSURE REQUIRED TO OPERATE CONTROLLER. ENERGIZE TO OPEN FOR ANTI-ICE.
ANTI-ICE SOLENOID
FAN CASE AREA RH SIDE
TEST BUS NO. 1
NO. 3 PACK FLOW CONTROL
ATM ON RELAY
ATM CONTROL
HP TIME DELAY ENG NO. 3
TO CLOSES WHEN ENERGIZED, OPENS 10 SEC LATER
BLEED AIR MIXING EJECTOR
ANTI-ICE SOLENOID. ENERGIZE TO OPEN FOR MIN PRESSURE DROP OR 512°F (267°C)
FROM ENG NO. 1
BLEED AIR SHUTOFF VALVE RELAY
FROM ENG NO. 2
PILOTS OVHD CB PNL, C81
THRUST REVERSE ENG 2
STANDBY BUS
NO. 3 PACK HIGH FLOW LOCKOUT RELAY
FOR APU/GND AIR REVERSERS HOLD SWITCH ENG NO. 3
PILOTS CENTER CONSOLE
ENGINE NO. 3
HIGH PRESS. VALVE
OPEN
CLOSED
SPLITTER AREA (ZONE 2)
DUCT OVERTEMP SW
CLOSED ABOVE 620°F (299°C)
ENGINE START CONTROL ENG 2
ENGINE START PILOTS OVERHEAD PANEL
GND START RELEASE
GND START
GND START RELAY ENG NO. 3
START CONT RELAY ENG NO. 3
ENGINE ISOLATION VALVE
ENERGIZE FOR ENGINE START AND THRUST REVERSAL TEST
PRESSURE REQUIRED TO OPEN VALVE
ENERGIZE TO CLOSE
ENG ISLN VALVE CLOSED RELAY
ISLN V NO. 3 LOCKOUT
NOTE
1 CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 36-11 UNLESS OTHERWISE NOTED
WM DIA CROSS REF.
CODE | WIRING DIA | SH
1 | 36-11-03 | 1
2 | 36-11-03 | 2
3 | 36-11-08 | 2
4 | 36-11-08 | 3
6 | 80-11-01 | 1
8 | 80-11-01 | 2

Engine No. 3 Bleed Air Electrical Schematic
SCHEM 3 (Sheet 2)

R EFFECTIVITY: 001, 003-999
R
001B



NOTE

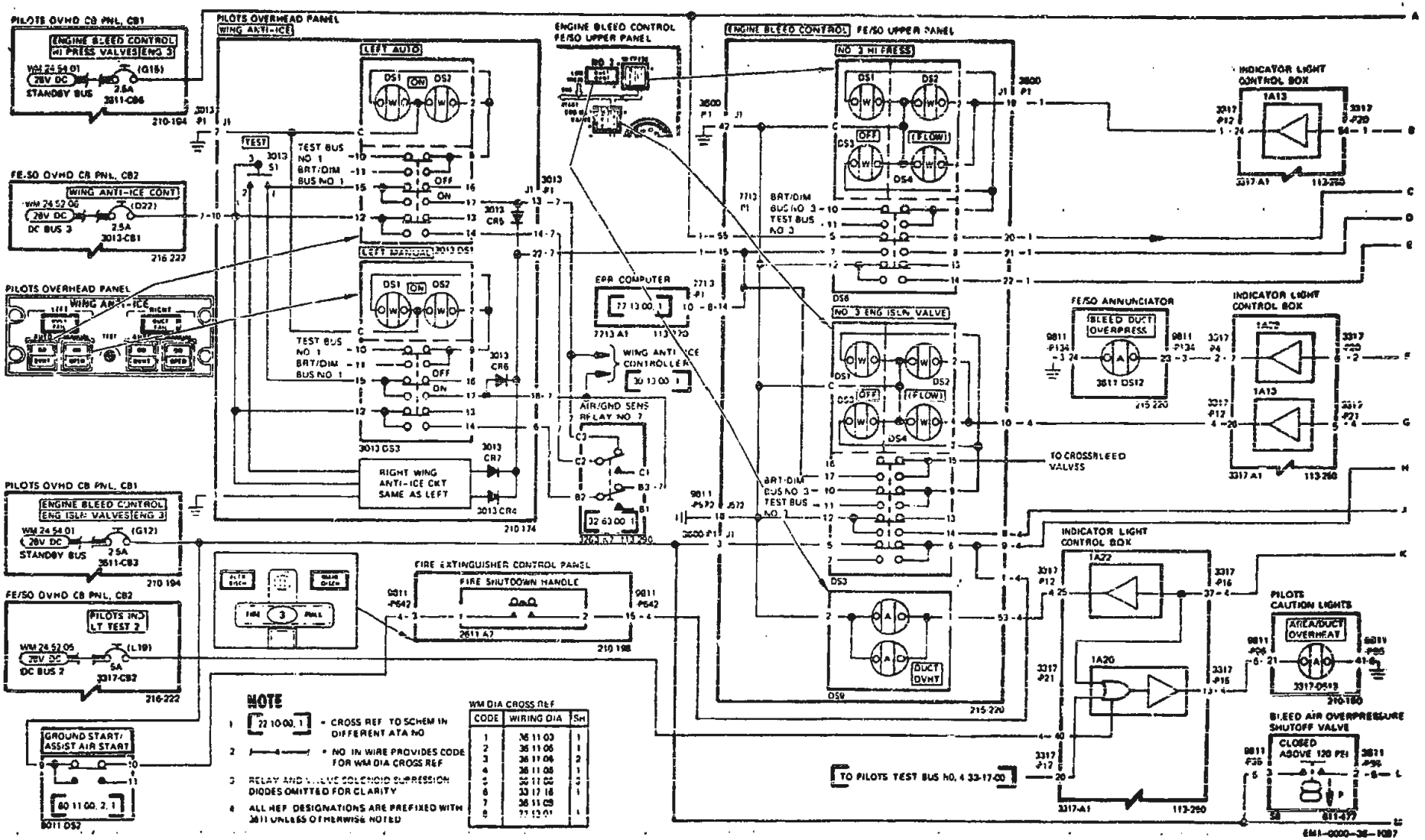
1. 22 10 00, 1 — CROSS REF TO SCHEM IN DIFFERENT ATA NO
2. —4— NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3. RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3811 UNLESS OTHERWISE NOTED

WM DIA CROSS REF

CODE	WIRING DIA	SH
1	36-11-03	1
2	36-11-05	1
3	36-11-05	2
4	36-11-08	1
5	33-17-12	1
6	33-17-16	1
7	36-11-08	1
8	77-13-01	1

Engine No. 3 Bleed Air Electrical Schematic
SCHEM 3 (Sheet 1)

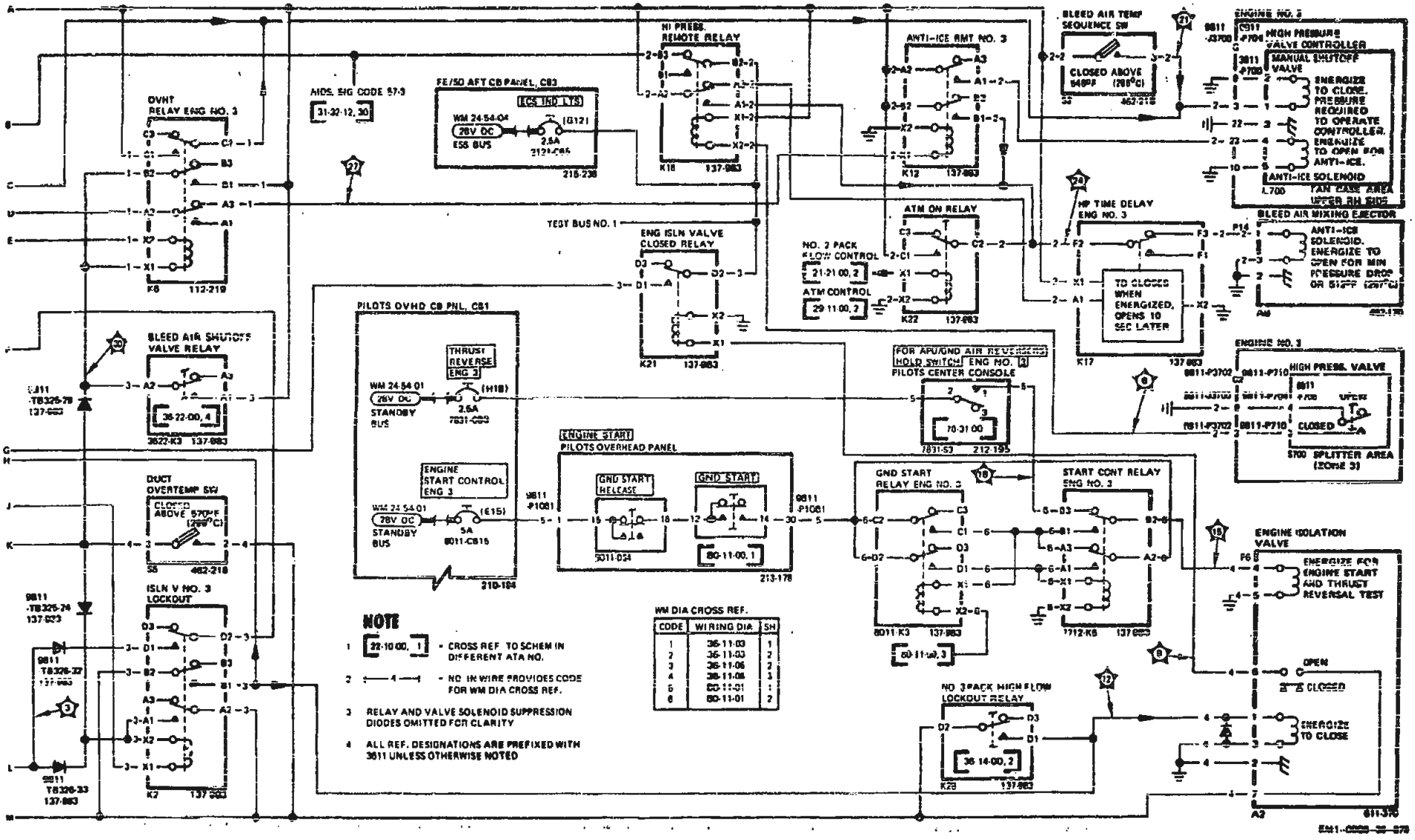
R EFFECTIVITY: 002 WITHOUT SB80-007
R
001B


PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
HI PRESS VALVES ENG 3
STANDBY BUS
PILOTS OVERHEAD PANEL
WING ANTI-ICE
LEFT AUTO
TEST BUS NO 1
BRT/DIM BUS NO 1
LEFT MANUAL
RIGHT WING ANTI-ICE CKT SAME AS LEFT
FE/SO OVHD CB PNL, CB2
WING ANTI-ICE CONT
DC BUS 3
ENGINE BLEED CONTROL FE/SO UPPER PANEL
ENGINE BLEED CONTROL FE/SO UPPER PANEL
NO 3 HI PRESS
BRT/DIM BUS NO 3
TEST BUS NO 3
EPR COMPUTER
WING ANTI ICE CONTROLLER
AIR/GND SENS RELAY NO 7
NO 3 ENG ISLN VALVE
TO CROSSBLEED VALVES
FE/SO ANNUNCIATOR
BLEED DUCT OVERPRESS
INDICATOR LIGHT CONTROL BOX
PILOTS OVHD CB PNL, CB1
ENGINE BLEED CONTROL
ENG ISLN VALVES ENG 3
STANDBY BUS
FE/SO OVHD CB PNL, CB2
PILOTS IND LT TEST 2
DC BUS 2
FIRE EXTINGUISHER CONTROL PANEL
FIRE SHUTDOWN HANDLE
INDICATOR LIGHT CONTROL BOX
PILOTS CAUTION LIGHTS
APU/DUCT OVERHEAT
GROUND START/ ASSIST AIR START
BLEED AIR OVERPRESSURE SHUTOFF VALVE
CLOSED ABOVE 120 PSI
TO PILOTS TEST BUS NO. 4 33-17-00
NOTE
1 22 10 00, 1 = CROSS REF TO SCHEM IN DIFFERENT ATA NO
2 = NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF
3 RELAY AND VALVE SOLENOID SUPPRESSION DIODES OMITTED FOR CLARITY
4 ALL REF DESIGNATIONS ARE PREFIXED WITH 3011 UNLESS OTHERWISE NOTED
WM DIA CROSS REF
CODE | WIRING DIA | SH
1 | 36 11 03 | 1
2 | 36 11 06 | 1
3 | 36 11 06 | 2
4 | 36 11 08 | 1
5 | 36 11 08 | 2
6 | 33 12 16 | 1
7 | 36 11 09 | 1
8 | 22 13 01 | 1

R Engine No. 3 Bleed Air Electrical Schematic
R SCHEM 3 (Sheet 1)

R EFFECTIVITY: 002 WITH SB80-007

001B



Engine No. 3 Bleed Air Electrical Schematic
SCHEM 3 (Sheet 2)

R EFFECTIVITY: 002
R
001B

ENGINE BLEED AIR SYSTEM - ADJUSTMENT AND TEST

1. General

No component of the engine bleed air system can be adjusted on the aircraft. If a component is suspected of being faulty, replace it and send it to the shop for a complete test.

The following procedure applies to all three engine systems. The procedure only determines whether the system is "go" or "no-go".

2. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
36-13-00	High pressure Ground Air System - Maintenance Practices
71-00-00	Power Plant - Adjustment and Test

R 3. Adjustment/Test

R A. Operational Check

R (1) Verify following circuit breakers are closed:

R On pilots overhead circuit breaker panel, CB1:

R THRUST REVERSE (H16, H17, H18)

R ENGINE BLEED CONTROL

R ENG ISLN VALVES (G10, G11, G12)

R HI PRESS VALVES (G13, G14, G15)

R On Flight Engineer/Second Officers overhead circuit
R breaker panel, CB2:

R WING ANTI-ICE (D22)

R PILOTS IND LT TEST 2 (H9)

R On Flight Engineer/Second Officers aft circuit breaker
R panel, CB3:

R ECS IND LT (G12)

R (2) Turn on electrical power (Ref. 24-00-00).

R (3) On Flight Engineer/Second Officers ENGINE BLEED CONTROL
R panel, release (out) all ENG ISLN VALVE, HI PRESS, aft
R fuselage ISLN VALVE and PACK FLOW CONTROL switchlights
R and verify all indicate OFF.

R (4) On pilots overhead WING ANTI-ICE panel, turn off system
R by releasing (out) any switchlights that indicate ON.

R (5) On LIGHTS panel, perform FE/SO station lights check by
R depressing TEST switch. Verify all ENGINE BLEED
R CONTROL panel lights come on.

R (6) Provide pressure to the pneumatic system by doing
R either of the following:

R (a) Turn on APU (Ref. 49-00-00) and on APU CONTROL
R panel, depress (latch in) APU BLEED AIR S/O
R switchlight so that it indicates OPEN.

R WARNING: PRIOR TO USING A HIGH PRESSURE GROUND AIR
R CONNECTOR, ENSURE THAT THE INTERNAL CHECK
R VALVE FLAPS HAVE FREE AND ADEQUATE MOVEMENT.
R IF ONE OR MORE FLAPS STICK IN THE OPEN
R POSITION, MOVE FLAP(S) TO THE SHUT POSITION
R AND IF POSSIBLE USE AN ALTERNATE CONNECTOR.

R (b) Connect high pressure ground air to the engine No.
R 2 ground air connection located forward of the
R wing center section. On APU CONTROL panel, verify
R APU BLEED AIR S/O switchlight does not indicate
R OPEN.

R (7) On APU CONTROL panel, depress (latch in) CROSSBLEED
R switchlights and aft fuselage ISLN VALVE switchlight,
R and verify flowbars come on.

R (8) On ENGINE BLEED CONTROL panel, depress (latch in) PACK
R FLOW CONTROL switchlight of an operable pack and verify
R flowbar comes on.

R (9) Perform the following procedure for each engine system
R individually:

R NOTE: Due to acceptable levels of leakage through
R closed Engine Isolation Valves, flow bars may or
R may not remain off during portions of the
R following test.

R (a) Depress (latch in) ENG ISLN VALVE and HI PRESS,
R switchlights for engine system being tested and

verify OFF lights go off, and flow bars do not immediately come on. Verify HI PRESS and ENG ISLN VALVE for other two engine systems indicate OFF.

(b) Perform steps listed in Table 501 below and while performing each step, lift and hold gaurded THRUST REVERSER TEST SWITCH for engine system under test. Switches are located on pilots center console under the ALTERNATE CONTROLS door.

CAUTION: IN STEP (e) OF TABLE 501 BELOW DO NOT ACTUATE FIRE EXTINGUISHER SWITCH WHEN ENGINE FIRE PULL HANDLE IS PULLED OUT.

TABLE 501

		ENG ISLN VALVE		HI PRESS	
PROCEDURE	DUCT OVHT	OFF LT	FLOW BAR	OFF LT	FLOW BAR
(a) Release (out) HI PRESS sw. lt.	OFF	OFF	ON	ON	OFF
(b) Latch (in) HI PRESS sw. lt.	OFF	OFF	ON	OFF	ON
(c) Release (out) ENG ISLN VALVE sw. lt.	OFF	ON	OFF	OFF	OFF
(d) Latch (in) ENG ISLN VALVE sw. lt.	OFF	OFF	ON	OFF	ON
(e) Read CAUTION above. Pull FIRE PULL handle for engine under test	OFF	OFF	OFF	OFF	OFF

(c) Push in engine FIRE PULL handle and verify both flowbars come on.

(d) Unlatch ENG ISLN VALVE and HI PRESS switchlights and repeat Step (9) for next engine until all engines are tested.

(10) If APU was used to pressurize system, shutdown APU and release APU BLEED AIR S/O switchlight.

R WARNING: AVOID DIRECT CONTACT WITH ANY HOT AIR LEAKAGE WHEN
R DISCONNECTING THE HIGH PRESSURE GROUND AIR SUPPLY
R FROM THE AIRCRAFT.

R (10) If high pressure ground air was used to pressurize
R system,
R disconnect high pressure ground air from ground air
R connection forward of the wing center section.

R (11) Perform the following Steps for each engine bleed air
R system individually:

R (a) Start engine to be tested (Ref. 71-00-00).

R (b) At ground idle power setting verify following for
R system being tested:

R ENG ISLN VALVE flowbar on

R HI PRESS flowbar on

R DUCT OVHT off

R BLEED DUCT OVERPRESS off

R One PACK FLOW CONTROL flowbar on pressure
R indicates below 55 psig

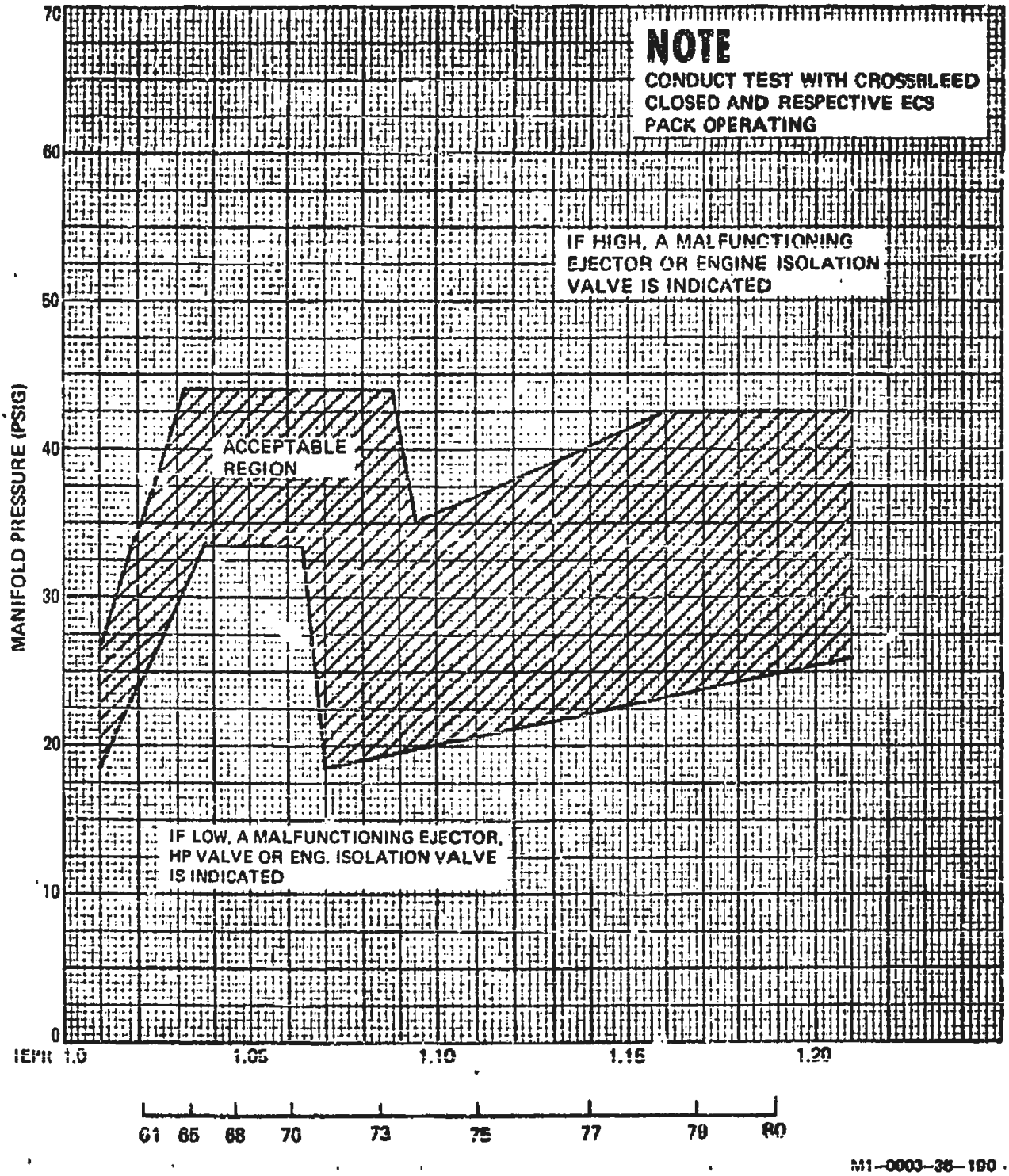
R (c) Slowly advance engine throttle. Verify pressure
R on gauge indicates between 30 and 44 psig when
R IEPR reaches 1.03.

R (d) Slowly advance engine throttle. Verify pressure
R on gauge remains within the bounds shown on Figure
R 501. Pressure should start to drop when IEPR is
R between 1.07 and 1.10.

R NOTE: If percent N3 is used as a parameter it
R should be corrected for temperature [Ref.
R Fig. 501 (Sheet 2)].

R (e) On ECS MONITOR panel set ECS temperature select
R knob to PACK INLET. Set PACK SELECT knob to pack
R system number on which PACK FLOW CONTROL valve was
R open in Step 8.

R (f) Slowly advance engine throttle. At 1.15 IEPR
R verify PACK INLET temperature indicates less than
R 230°C (446°F).



R Bleed Air System Parameters
R Figure 501 (Sheet 1)

EFFECTIVITY: ALL

001B

R CAUTION: IN STEP (g) DO NOT HOLD WING ANTI-ICE TEST
R BUTTON DEPRESSED FOR MORE THAN 60 SECONDS AT
R A TIME. ALLOW AT LEAST 2 MINUTES INTERVAL
R BETWEEN ANTI-ICE OPERATION, IF ANTI-ICE
R "OVERHEAT" ILLUMINATES, ALLOW COOLDOWN PRIOR
R TO CONTINUED USAGE OF TEST FUNCTION.

R (g) With IEPR still at 1.15, on WING ANTI-ICE panel,
R depress (latch in) MANUAL switchlight. Latch in
R LEFT switchlight for engine No. 1 and RIGHT
R switchlight for engine No. 3. For engine No. 2
R latch in either. Verify switchlight ON legend
R comes on. Depress the TEST button. Verify
R switchlight OPEN legend comes on. Verify PACK
R INLET temperature rises to at least 260°C (500°F)
R but does not exceed 274°C (525°F).

R (h) Slowly advance engine throttle. Verify HI PRESS
R flowbar goes off at between 1.20 and 1.30 IEPR.

R (i) Shut down engine (Ref. 71-00-00) and repeat Step
R 11 for next engine system until all three are
R tested.

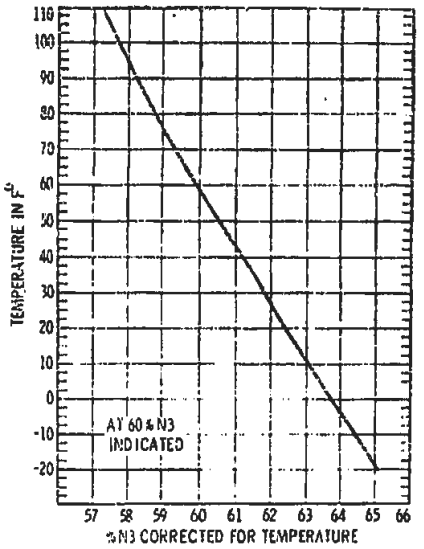
R (12) Turn off electrical power if no longer required (Ref.
R 24-00-00) and return all switchlights to their normal
R positions.

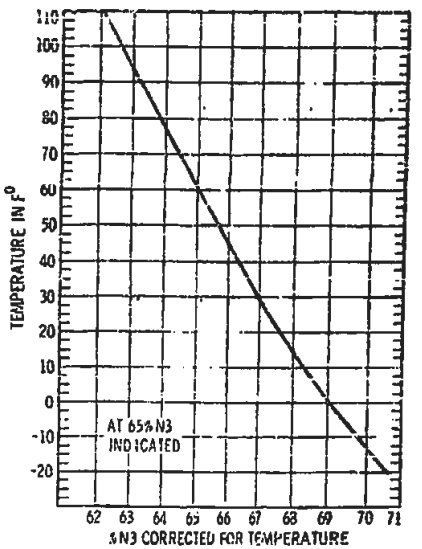
%N3 CORRECTION EQUATION

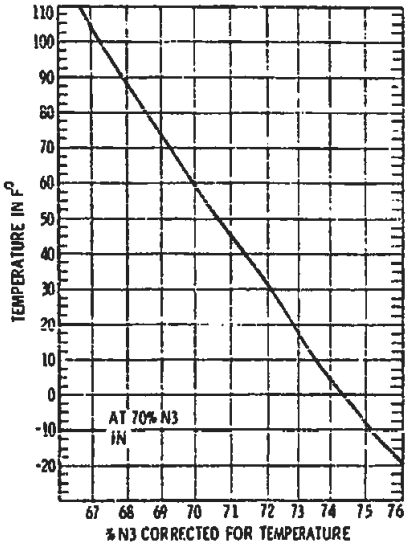
$$\theta = \frac{\text{LOCAL TEMP IN RANKINE}}{519}$$

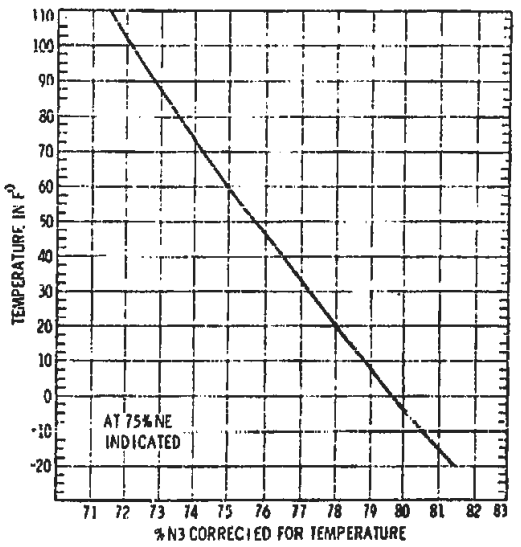
$$\text{CORRECTED \%N3} = \frac{\text{\%N3 INDICATED}}{\sqrt{\theta}}$$

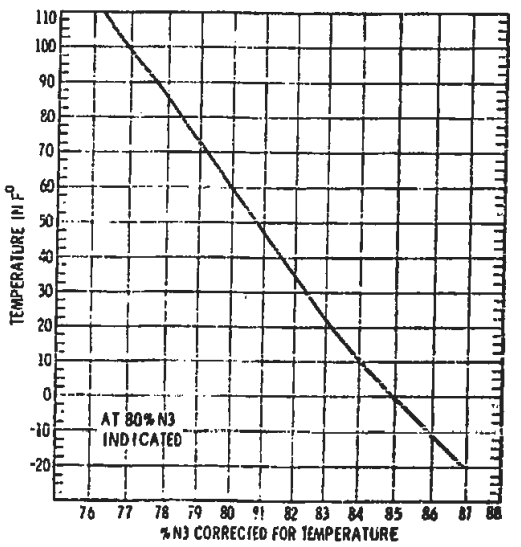
TO USE N3 AS A PARAMETER, INDICATED N3 SHOULD BE CORRECTED FOR LOCAL TEMPERATURE.











M1-0000-36-1104

R Bleed Air System Parameters
R Figure 501 (Sheet 2)

EFFECTIVITY: ALL

001B

ENGINE HIGH-PRESSURE VALVE - MAINTENANCE PRACTICES

1. General

The high-pressure (HP) bleed valves are shutoff valves pneumatically controlled by the high-pressure bleed valve controllers. One valve is located in the splitter area, zone 3, of each engine, between the thrust reverser duct and the mixing ejector inlet duct. Deactivation procedures are the same for No. 1, No. 2, and No. 3 engine high-pressure valves except for access panel references.

2. Equipment and Materials

Splitter area access work platform PN CP2039 or XUT. 37594, Rolls-Royce Ltd., or equivalent

3. Referenced Procedure

78-30-00 Thrust reverser - Servicing

4. Maintenance Practices

A. Deactivation

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

R (1) At the Flight Engineer/Second (FE/SO) Officers station, tag engine bleed control panel and APU control panel.

R (2) Underneath fuselage, tag the three external high-pressure ground air connections and APU external control panel.

R (3) Deactivate engine thrust reverser in retracted position (Ref. 78-30-00, thrust reverser - servicing).

R (4) Place splitter area access work platform into engine cold stream duct cowling.

(5) Open splitter access panel 418BR for engine No. 1 valve, 428BR for engine No. 2 valve, or 438BR for engine No. 3 valve (Ref. Fig. 201).

(6) Remove valve manual locking bolt from normal operating position in fitting on valve actuator cylinder head.

(7) Use 1/2-inch wrench to rotate manual override hex to close valve.

(8) When valve position indicator lever is in full closed position, install valve manual locking bolt through valve housing and lever. Torque position screw.

(9) Close access panel opened in Step 4A(5).

(10) Remove splitter area access work platform from engine cold stream duct.

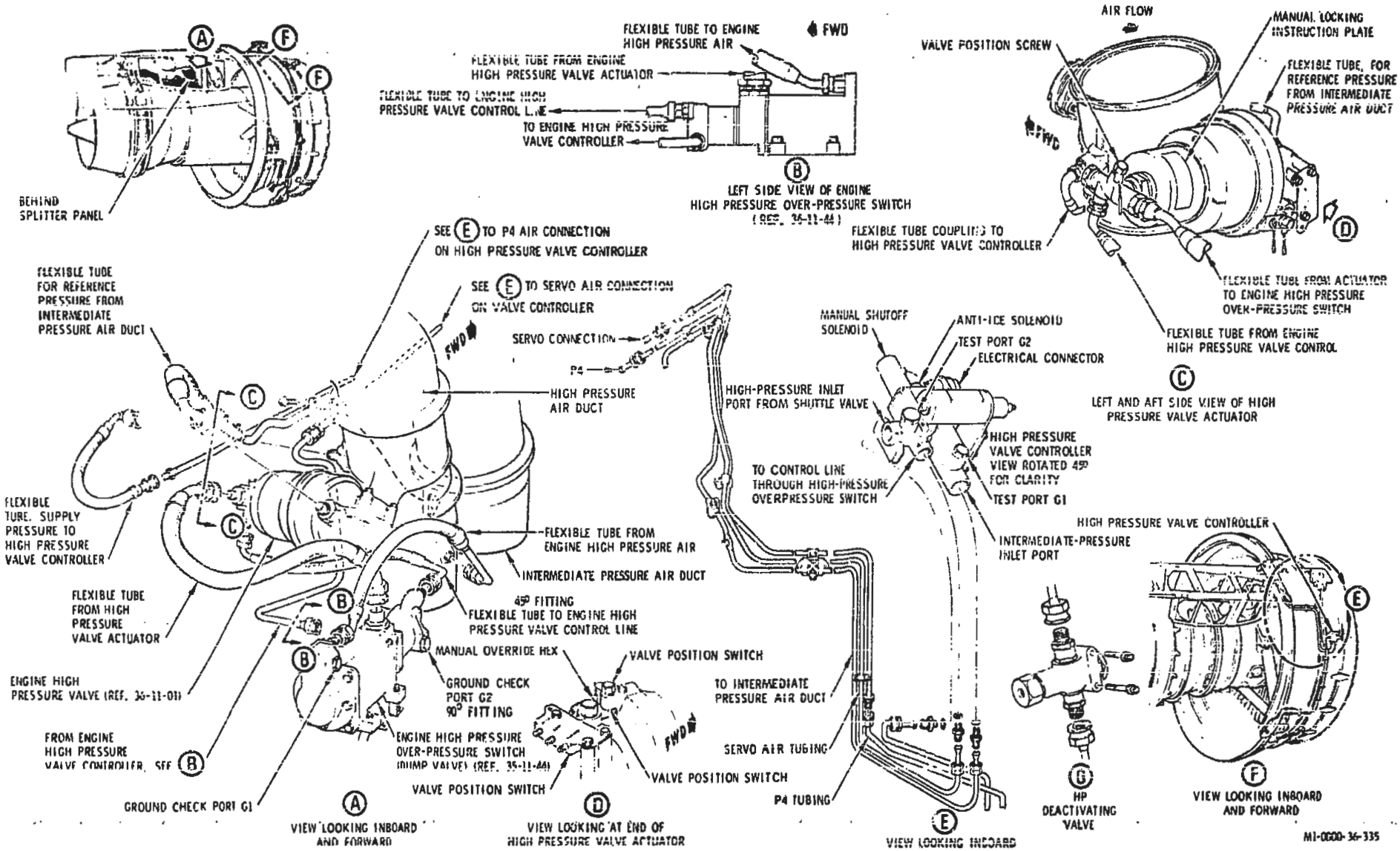
(11) Remove tags from panels and fittings listed in Paragraph 4A. R

(12) Reactivate the engine thrust reverser.

(13) On FE/SO ENGINE BLEED CONTROL panel, zone 215, placard applicable HI PRESS switchlight ENGINE HIGH-PRESSURE VALVE INOPERATIVE.

NOTE: Do not open associated HP valve circuit breaker unless valve is locked closed as in Steps 4A(6), (7) and (8).

(14) Make appropriate entry in aircraft log book.


BEHIND SPLITTER PANEL
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE AIR
FWD
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
TO ENGINE HIGH PRESSURE VALVE CONTROLLER
LEFT SIDE VIEW OF ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (REF. 36-11-44)
AIR FLOW
VALVE POSITION SCREW
MANUAL LOCKING INSTRUCTION PLATE
FLEXIBLE TUBE, FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
FLEXIBLE TUBE COUPLING TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM ACTUATOR TO ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE CONTROL
LEFT AND AFT SIDE VIEW OF HIGH PRESSURE VALVE ACTUATOR
SEE E TO P4 AIR CONNECTION ON HIGH PRESSURE VALVE CONTROLLER
SEE E TO SERVO AIR CONNECTION ON VALVE CONTROLLER
FLEXIBLE TUBE FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
SERVO CONNECTION
P4
HIGH PRESSURE AIR DUCT
HIGH-PRESSURE INLET PORT FROM SHUTTLE VALVE
MANUAL SHUTOFF SOLENOID
ANTI-ICE SOLENOID
TEST PORT G2
ELECTRICAL CONNECTOR
HIGH PRESSURE VALVE CONTROLLER VIEW ROTATED 45° FOR CLARITY
TEST PORT G1
TO CONTROL LINE THROUGH HIGH-PRESSURE OVERPRESSURE SWITCH
FLEXIBLE TUBE, SUPPLY PRESSURE TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE AIR
INTERMEDIATE PRESSURE AIR DUCT
45° FITTING
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
HIGH PRESSURE VALVE CONTROLLER
INTERMEDIATE-PRESSURE INLET PORT
ENGINE HIGH PRESSURE VALVE (REF. 36-11-01)
MANUAL OVERRIDE HEX
VALVE POSITION SWITCH
GROUND CHECK PORT G2 90° FITTING
TO INTERMEDIATE PRESSURE AIR DUCT
FROM ENGINE HIGH PRESSURE VALVE CONTROLLER, SEE B
ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (DUMP VALVE) (REF. 35-11-44)
SERVO AIR TUBING
VALVE POSITION SWITCH
VALVE POSITION SWITCH
P4 TUBING
GROUND CHECK PORT G1
VIEW LOOKING INBOARD AND FORWARD
VIEW LOOKING AT END OF HIGH PRESSURE VALVE ACTUATOR
VIEW LOOKING INBOARD
HP DEACTIVATING VALVE
VIEW LOOKING INBOARD AND FORWARD
MI-0000-36-335

CR Engine High-Pressure Valve - Deactivation
CR Figure 201

EFFECTIVITY: ALL

0018

ENGINE HIGH PRESSURE VALVE - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for No. 1, No. 2, and No. 3 engine high pressure valves except for circuit breaker and access panel references.

2. Equipment and Materials

Engine High Pressure Valve

Protective Plugs and Caps

Splitter Area Access Work platform

valve Position Switch

GS14160-1 Protractor

Crimping Tool - MS 3191-3

Epoxy Primer - Fed. Spec MIL-P-23377

Anti-Seize Compound-Fed. Spec MIL-T-5544B

Loctite Sealant, type II - Fed. Spec MIL-S-46082

3. Referenced Procedures

R	6-50-00	Interior Access Doors and Removable Panels
	20-36-02	Double T-Bolt V-Band Coupling - Removal and Installation
	36-11-00	Engine Bleed Air System - Adjustment and Test
	70-51-00	Torque Tightening Technique
	78-30-00	Thrust Reverser Servicing

4. Removal/Installation - Engine High Pressure Valve

A. Removal

(1) Tag the following to prevent operation until completion of procedures:

(a) Flight Engineer/Second Officers (FE/SO) bleed air and APU panels.

(b) Center console - engine throttles.

(c) Pilots overhead panel - engine start switches.

(d) Base of center console - APU/GND air thrust reverser test switches

(e) Three external high-pressure ground air connections.

(2) On Pilots Overhead Circuit Breaker Panel, CB1, zone 210, open and tag the following applicable circuit breakers:

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15).

(3) Install thrust reverser deactivator pip-pin (Ref 78-30-00).

(4) Install splitter area access work platform (Ref. Fig. 401).

(5) Remove access panels 418BL and 418BR for ENG. 1, 428BL and 428BR for ENG. 2, 438BL and 438BR for ENG. 3 (Ref. 6-50-00).

R
R

NOTE: Working from both sides will facilitate removal.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(6) Remove wires from wiring disconnect studs (Ref. Fig. 401).

(7) Remove the following 4 flexible hoses from high pressure valve:

(a) 1 hose from valve body - goes to valve controller.

(b) 2 hoses from outboard end of valve actuator - go to overpressure switch.

(c) 1 hose from inboard end of valve actuator - goes to intermediate pressure duct.

NOTE: Plug or cap all open lines.

(8) Remove double T-bolt V-band couplings securing inlet and outlet flanges to duct (Ref. 20-36-02).

(9) Remove high pressure valve.

(10) Install protective covers over ducts.

B. Installation

(1) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

(2) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

R CAUTION: ENSURE THAT VALVE IS CORRECTLY ALIGNED PRIOR TO
R SECURING. IMPROPER ALIGNMENT CAN CAUSE THE VALVE
R POSITION SWITCH CENTER STUD TO FOUL A BOLT IN THE
R BLOWOUT PANEL WITH RESULTING MALFUNCTION.

(3) Align valve to duct as dictated by alignment marks with flow arrow pointing up (Ref. Fig. 401).

(4) Secure inlet and outlet flanges with double T-bolt V-band couplings (Ref. 20-36-02).

(5) Install 4 flexible hoses to high pressure valve removed in Step 4A(7). Torque all tube nuts (Ref. 70-51-00).

(6) Install 3 wires on disconnect studs removed in Step 4A(6).

(7) Install access panels removed in Step 4A(5).

(8) Remove splitter area access work platform installed in Step 4A(4).

(9) Remove thrust reverser deactivator pip-pin installed in Step 4A(3).

(10) Remove tag and close circuit breaker opened in Step 4A(2).

(11) Remove all tags and placards installed in Step 4A(1).

(12) Perform pertinent steps of Engine Bleed Air System - Adjustment and Test (Ref. 36-11-00) on high pressure valve that was replaced.

5. Removal/Installation - Valve Position Switch

A. Removal

(1) Tag the following to prevent operation until completion of procedures:

(a) FE/SO bleed air and APU panels.

(b) Center console - Engine Throttles.

(c) Pilots overhead panel - engine start switches.

(d) Base of center console - APU/GND air thrust reverser test switches.

(e) Three external high-pressure ground air connections.

(2) On Pilots Overhead Circuit Breaker Panel, CB1, zone 210, open and tag the following applicable circuit breaker:

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15).

(3) Install thrust reverser deactivator pip-pin (Ref. 78-30-00).

(4) Install splitter area access work platform (Ref. Fig. 401).

(5) Remove access panels 418BR for ENG. 1, 428BR for ENG. 2, 438BR for ENG. 3 (Ref. 6-50-00).

R

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURE. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

R R (6) Remove wires from wiring disconnect studs (Ref. Fig. 401).

R R (7) Remove three bolts and washers to release valve position switch bracket from actuator crankcase.

R (8) Remove nuts, and washers to release switch terminal lugs from wiring disconnect. Remove outer nut and lockwasher to release switch from bracket. (Ref. Fig. 402).

NOTE: Do not separate terminal lugs from switch leads.

R R (9) Remove nuts and washers to separate wiring disconnect studs from electrical insulator.

R (10) Remove nuts, washers and screws to separate electrical insulator from bracket and release switch ground terminal lug.

B. Installation

R (1) Verify that circuit breaker opened in Step 5A(2) is open and tagged.

R (2) Remove outer nut and washer on switch, coat threads of switch with anti-seize compound (MIL-T-5544B) and secure switch to bracket with removed washer and nut.

(3) Install two or three (as applicable) wiring disconnect studs into electrical insulator as follows:

R R R WARNING: DO NOT ALLOW SEALANT TO CONTACT EYES. PROLONGED EXPOSURE MAY RESULT IN EYE IRRITATION.

(a) Prime threads of the long-threaded section of each wiring disconnect stud with Loctite Primer T and Loctite Sealant, Type II (MIL-S-46082, Type II), prior to installing.

(b) Secure with washer and nut on each stud. Tighten nut to a torque of 10 to 15 lb-in.

(4) If using a new switch, install terminal lugs as follows:

(a) Cut wire length on new switch to 3.0 inches.

(b) Strip wiring insulation to a 0.187 to 0.234-inch length.

(c) Using four new terminal lugs, crimp two leads from switch using crimping tool MS3191-3.

NOTE: Use position "A" on tool when working with 20-24 gage wire. Crimp using one full stroke of tool. Inspect crimp for wire visibility through inspection hole in lug.

(5) Attach electrical insulator to bracket using screws, washers and nuts. Coat threads of screws with R anti-seize thread compound (MIL-T-5544B) before installation. Place washer under head of each screw, one between insulator and bracket and one between bracket and nut. Install ground wire (black) terminal lug onto adjacent screw, closest to GND marking on bracket. Secure with nut and tighten to a torque of 25 to 30 lb-in.

CAUTION: INSTALL LUGS TO TERMINALS SO THAT WIRES ARE NOT PINCHED BETWEEN INSULATOR AND BRACKET.

(6) When assembling an L6 valve, attach blue switch lead to CLOSE terminal, red lead to COM terminal, and white lead to OPEN terminal. Place washer on each side of the terminal lug when installing a stud. Secure each lug with nut and tighten to a torque of 25 to 30 lb-in.

(7) When assembling an L9 valve, attach white and red leads to COM terminal and blue lead to CLOSE terminal.

WARNING: USE PRIMER IN WELL-VENTILATED AREA. DO NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH SKIN AND EYES. PROLONGED EXPOSURE MAY RESULT IN UNCONSCIOUSNESS OR LUNG, SKIN, OR EYE IRRITATION.

(8) Secure bracket to crankcase using three bolts and washers. Coat both sides of washers with epoxy primer conforming to MIL-P-23377 and air dry 15 minutes before assembly. Apply anti-seize compound MIL-T-5544B to threads of bolts before installing. Tighten bolts to a torque of 15 to 20 lb-in.

(9) Install wires on disconnect studs removed in Step 5A(6).

(10) Attach protractor GS14160-1 to end of valve shaft.

(11) Zero protractor indicator with valve in full closed position, midway in linkage backlash between disk and piston with piston against its closed position stop.

(12) Attach 21V to 27V dc to COM terminal with test lamp between ground and CLOSE terminal.

(13) Open valve to over 45° and observe test lamp is out.

(14) Rotate butterfly towards close and observe test lamp comes on between 9° and 3° from closed. If test lamp is still out, adjust setscrew (on L4 valve) or move bracket (on L6 or L9 valve) until test lamp comes on.

(15) Remove electrical test setup to switch and protractor.

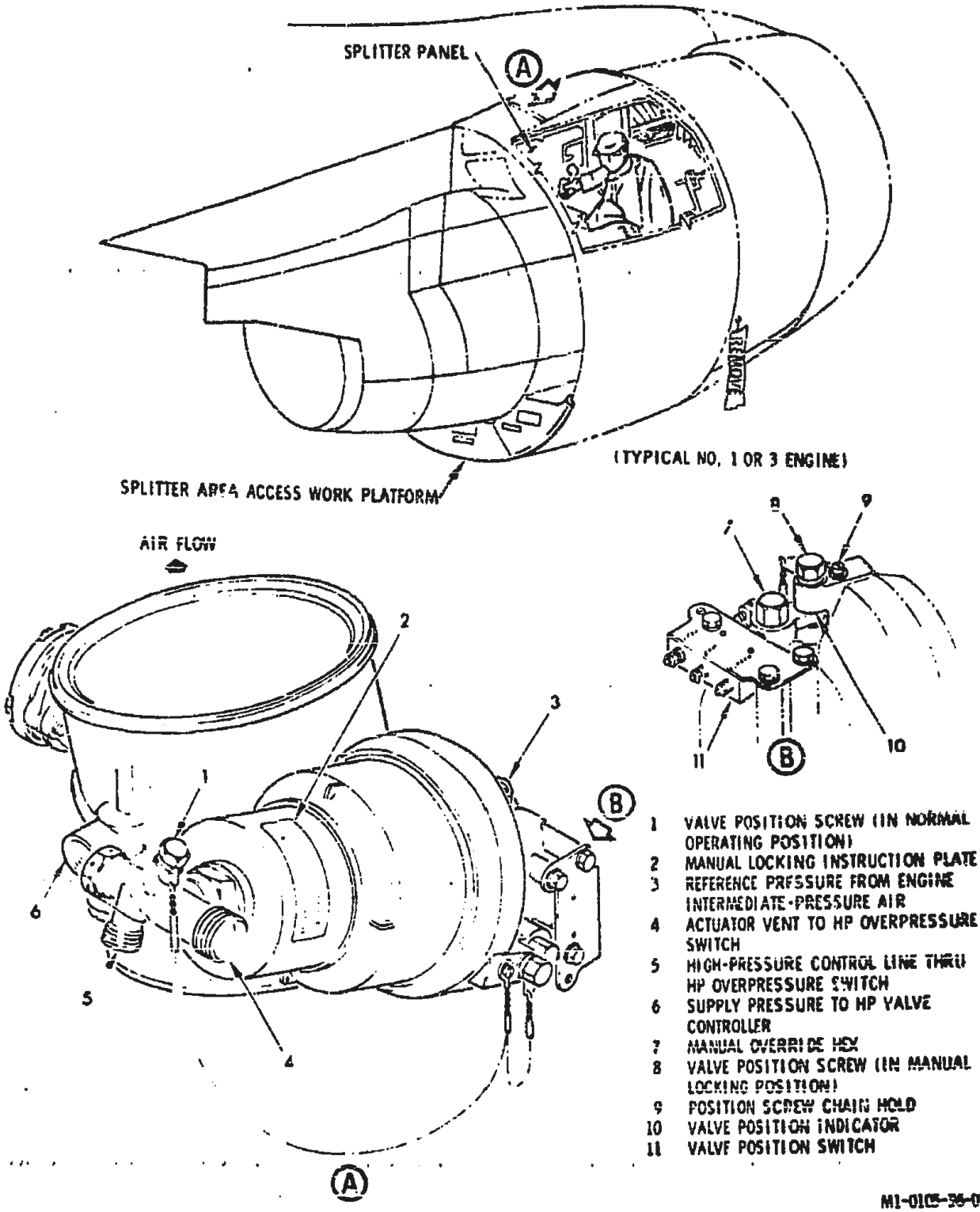
(16) Install access panels removed in Step 5A(5).

(17) Remove splitter area access work platform installed in step 5A(4).

(18) Remove thrust reverser deactivator pip-pin installed in Step 5A(3).

(19) Remove tag and close circuit breaker opened in Step 5A(2).

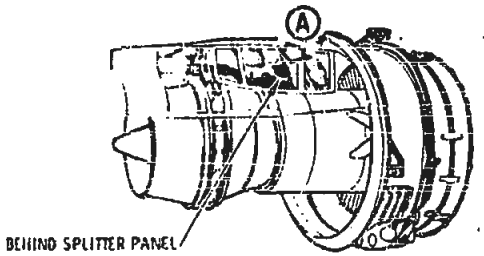
(20) Remove all tags and placards installed in Step 5A(1).

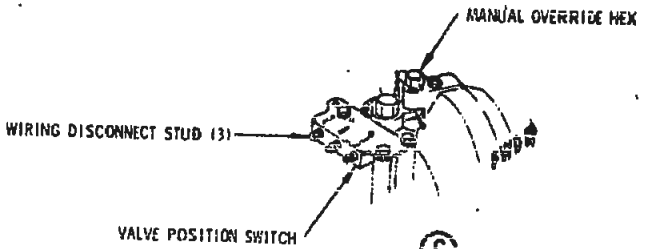


R
R
R

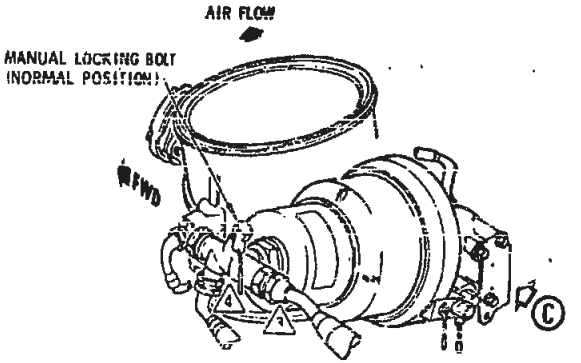
Engine High Pressure Valve
Removal and Installation
Figure 401 (Sheet 1)

EFFECTIVITY: ALL

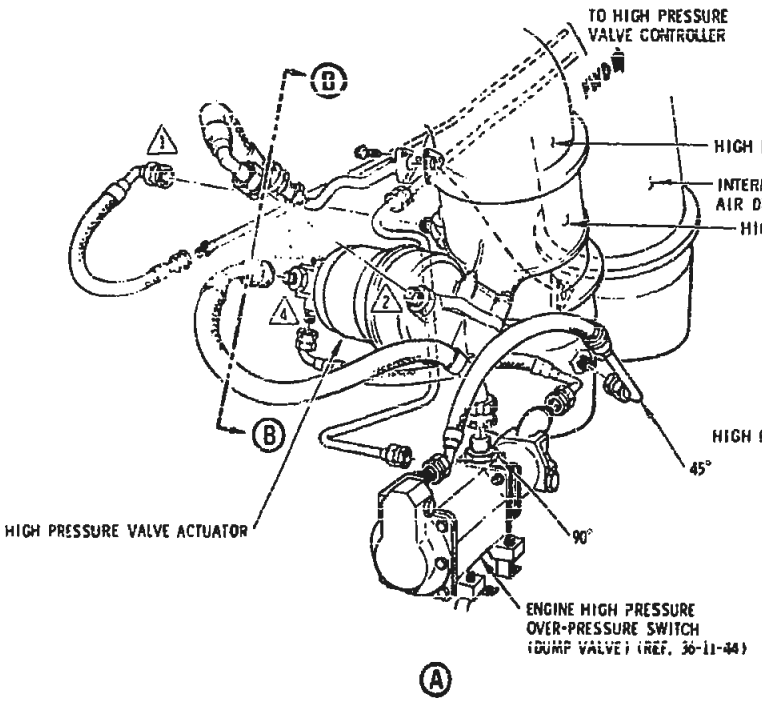




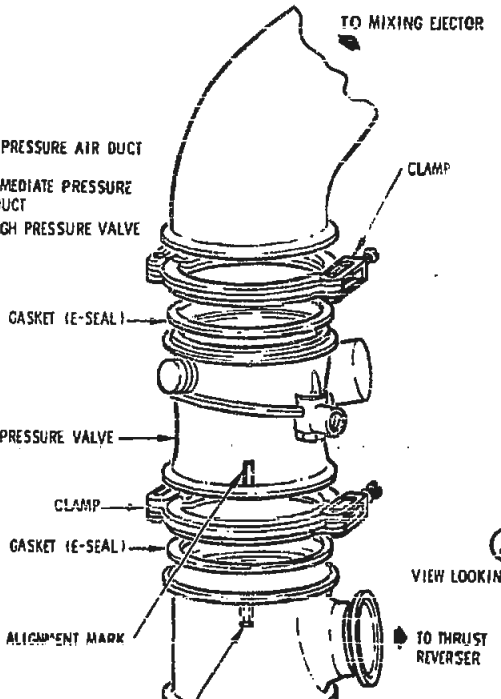
C
VIEW LOOKING AT END OF HIGH PRESSURE VALVE ACTUATOR



B
LEFT AND AFT SIDE VIEW OF HIGH PRESSURE VALVE ACTUATOR



A
VIEW LOOKING INBOARD AND FORWARD



A
VIEW LOOKING OUTBOARD

NOTE

1. FLEXIBLE HOSE DISCONNECT POINT, HIGH PRESSURE VALVE BODY TO HP CONTROLLER
2. FLEXIBLE HOSE DISCONNECT POINT, HIGH PRESSURE VALVE ACTUATOR TO INTERMEDIATE PRESSURE DUCT
3. FLEXIBLE HOSE DISCONNECT POINT, HIGH PRESSURE VALVE ACTUATOR OUTBOARD TOP FITTING TO OVER-PRESSURE SWITCH TOP FITTING
4. FLEXIBLE HOSE DISCONNECT POINT, HIGH PRESSURE VALVE ACTUATOR OUTBOARD BOTTOM FITTING TO OVERPRESSURE SWITCH FORWARD END FITTING

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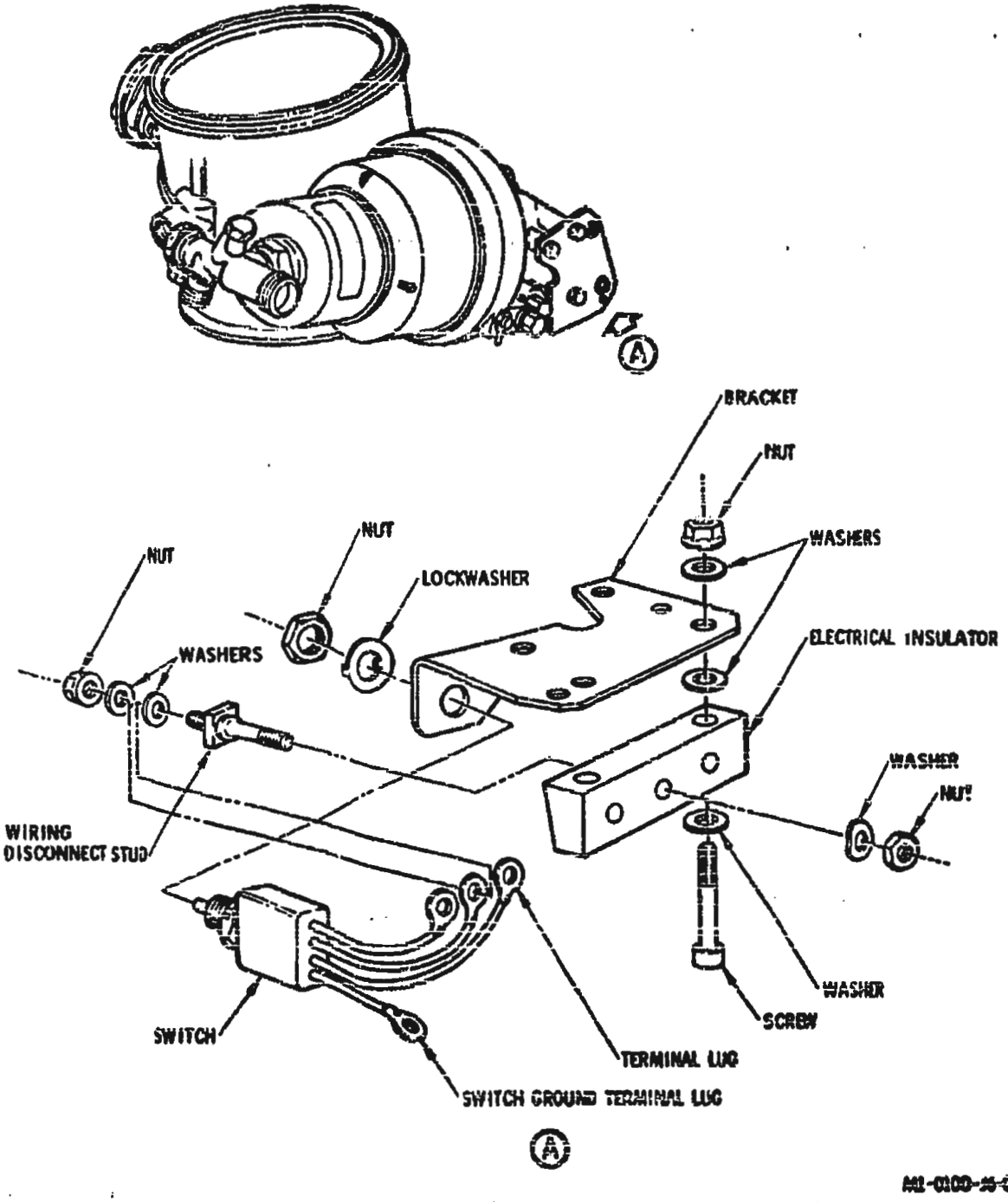
CR
CR
CR

Engine High Pressure Valve
Removal and Installation
Figure 401 (Sheet 2)

EFFECTIVITY: ALL

0018



R
R
R Valve Position Switch
Removal and Installation
Figure 402

R EFFECTIVITY: ALL
R
001B

HIGH-PRESSURE VALVE CONTROLLER - MAINTENANCE PRACTICES

1. General

The high-pressure bleed valve controllers are servo controls for the high-pressure bleed valves. The controllers are located under the right side nose cowl of each engine.

2. Referenced Procedure

36-11-01 Engine High-pressure Valve - Maintenance Practices

3. Maintenance Practices

A. Deactivation

(1) Deactivate engine high-pressure valve on engine with inoperative high-pressure valve controller (Ref. 36-11-01).

(2) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, zone 215, placard applicable HI PRESS switchlight CONTROLLER INOPERATIVE, HI PRESS VALVE DEACTIVATED.

(3) Make appropriate entry in aircraft log book.

CR 4. Engine High Pressure Bleed Valve Controller Restrictor Check
CR Valve

CR A. M.O. 70F06 will be accomplished on the high pressure bleed
CR valve controller to:

CR (1) Reduce the possibility of the high pressure bleed valve
CR to be commanded open when in high altitude cruise;

CR (2) Prevent diaphragm damage on assembly;

CR (3) Minimize the possibility of a slow opening high
CR pressure bleed valve.

CR B. The restrictor check valve installed in the servo port
CR marked ACT will be modified to enlarge the orifice to a
CR .036-.039 diameter. The reworked restrictor check valve,
CR P/N 764898-2, will accomplish item A.(3) above.

CR C. The restrictor check valve serves the function of preventing
CR extremely rapid high pressure valve open operation, which
CR can cause high pressure excursions in the pneumatic ducting
CR with possible eventual failure of ducting or components.

CR D. A high pressure controller should NOT be operated without
CR the restrictor check valve installed.

CR E. The Accessory Shop has advised that many returned
CR controllers have a straight fitting substitute for the
CR restrictor check valve. Although this procedure was
CR approved by a previous MSL (MSL 76-232-C56), the
CR substitution is no longer an acceptable maintenance
CR practice.

CR NOTE: All surplus restrictor check valves, Mfr P/N
CR 764898-1, should be returned to W. H. Kimball,
CR 1-2500, MCI (Ref. M.O. 70F06).

HIGH-PRESSURE VALVE CONTROLLER - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for NO. 1, NO. 2 and NO. 3 engine high pressure valve controllers except for circuit breaker and access panel references. The controller is located on the upper right portion of the engine accessories compartment, accessible by lifting the right hand engine cowling
R panel on engines No. 1 and 3 and through access panel 434DR on engine No. 2 (Ref. Fig. 401).

2. Equipment and Materials

Protective Plugs and Caps

3. Referenced Procedures

36-11-00 Engine Bleed Air System-Adjustment and Test

78-30-00 Thrust Reverser - Servicing

4. Removal/Installation

R A. Removal

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

R (1) Tag the following to prevent operation until completion
R of procedures:

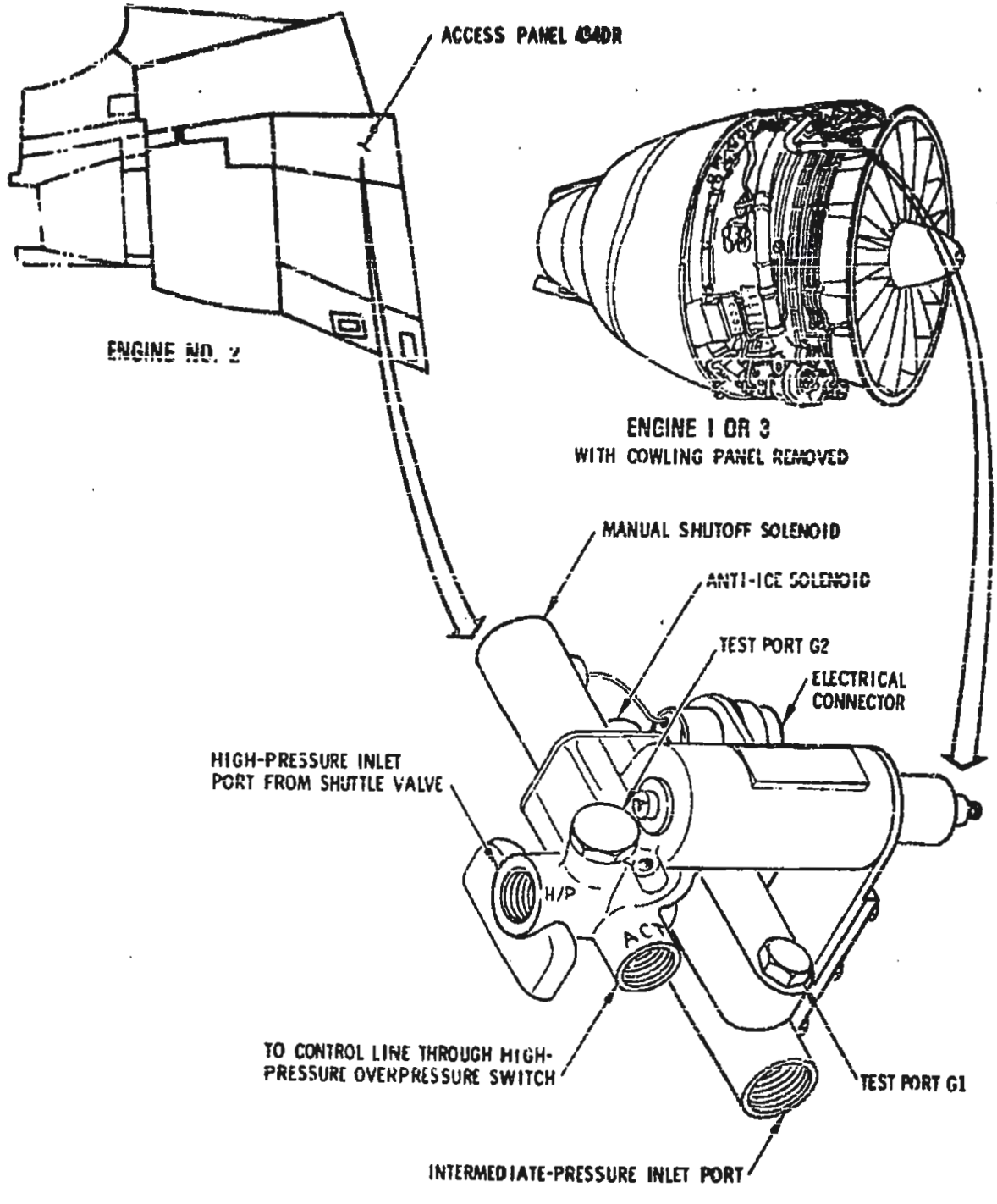
(a) FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND APU PANELS.

(b) CENTER CONSOLE - ENGINE THROTTLES.

(c) PILOTS OVERHEAD PANEL - ENGINE START SWITCHES.

(d) BASE OF CENTER CONSOLE - APU/GND AIR THRUST REVERSER TEST SWITCHES.

(e) THREE EXTERNAL HIGH-PRESSURE GROUND AIR CONNECTIONS.



R High Pressure Valve Controller-Removal and Installation
R Figure 401

R (2) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13), ENG 2 (G14), or ENG 3 (G15), as applicable.

R (3) Lift right hand hinged cowl 414A, 424A for engines 1 or 3 and locate high pressure valve controller (Ref. Fig.
R 401). Open access panel 434DR for engine 2 and locate high pressure valve controller (Ref. Fig. 401).

R (4) Remove electrical plug from controller connector and install caps on the electrical plug and controller connector.

R (5) Disconnect three tubings, one each from Intermediate pressure inlet port, high pressure switch and high pressure inlet port and cap the tubings.

R (6) Remove mounting bolts and washers from the base of the controller, and save bolts and washers for reuse.

R (7) Remove high pressure valve controller.

R (8) Remove three adapters and seals from the high pressure valve controller and save adapters and seals for reuse.

B. Installation

(1) Install three seals and adapters to the three ports of high pressure valve controller and tighten the adapters.

(2) Install high pressure valve controller with mounting bolts and washers and tighten the bolts.

(3) Install three tubings (from intermediate pressure inlet port, high pressure switch and high pressure inlet port) on corresponding adapters and tighten the adapter and tubing.

(4) Connect electrical plug to the controller connector.

(5) Install access panel removed in Step 4A(2).

(6) Remove tag and close circuit breakers opened in Step 4A(1).

(7) Remove all tags and placards installed in Paragraph 4.

(8) Perform pertinent steps of Engine Bleed Air System - Adjustment and Test (36-11-00) on Engine with new controller.

MIXING EJECTOR - MAINTENANCE PRACTICES

1. General

The bleed air mixing ejectors are pneumatic mixing jet pumps used to mix engine high-pressure bleed air with intermediate-pressure bleed air. The mixing ejectors for No. 1 and No. 3 engines are in the pylons just above the engine hoop plate. The mixing ejector for No. 2 engine is in structure above that engine.

2. Referenced Procedure

36-11-01 Engine High-pressure Valve - Maintenance Practices

3. Maintenance Practices

R A. Deactivation of Engine High-pressure Valve

(1) Deactivate engine high-pressure valve on engine with inoperative engine mixing ejector (Ref. 36-11-01).

R B. Deactivation of Mixing Ejector

R (1) Open pylon Panels 452/462BT for engine 1 or 3, or open
R access panel 471CR for engine 2.

R (2) Remove vent plug and locking device to vent actuator
R servo pressure.

R (3) Use 1/2 inch wrench on manual override to rotate
R position indicator and manual lock lever to "LOCK
R CLOSED" position

R (4) Insert vent plug and manual locking device into locking
R boss through lever and tighten.

R (5) Close access panel opened in Step 3B(1).

R C. On Flight Engineer/Second Officers ENGINE BLEED CONTROL
R panel, zone 215, placard applicable HI PRESS switchlight
R MIXING EJECTOR INOPERATIVE, HI PRESS VALVE DEACTIVATED.

R D. Make appropriate entry in aircraft log book.

MIXING EJECTOR - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the wing (No. 1 and 3) engine mixing ejectors except for circuit breaker and access panel references. Removal and installation procedures for the center (No. 2) engine using a handling beam is outlined separately. Removal and installation procedures for the air filter are the same for all 3 ejectors except for circuit breaker and access panel references.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent - Wing Engine

Mixing Ejector Handling Beam, BA03 - Center Engine

Overhead Hoist or Crane

R Protective covers

Wood or micarta block approximately 30 inches long, 3-3/4 inches high and 1-3/4 inches wide

Anti-seize Compound-Strontium Chromate Galvanic Insulation Film Type A-136-2CP or Equivalent Andrew Brown Company Irving Texas.

Air Filter Hamilton Standard P/N 727604

Preformed Packing Hamilton Standard P/N 69494J910

3. Referenced Procedures

R	6-40-00	Exterior Access Doors and Panels
	20-00-06	Safetying Practices
	20-36-02	Double T-bolt V-band Coupling - Removal and Installation
	36-11-08	Mixing Ejector - Adjustment and Test
	36-11-47	Wing Engine Starter Duct - Removal and Installation
	54-11-01	Wing Pylon Box Sructure - Removal and Installation

4. Removal/Installation - Mixing Ejector

A. Wing-Engine Ejector - Removal

(1) Placard Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On the pilots overhead circuit breaker panel CB1, zone 210, open and tag the following applicable circuit breaker:

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15).

(3) Remove pylon access panels 452AT, 452BT, and 452CT for engine No. 1, or 462AT, 462BT, and 462CT for engine No. 3 (Ref. 6-40-00).

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURE. PROTECTIVE GLOVES SHOULD BE USED.

(4) Disconnect starter duct support, remove duct and compensator above the mixing ejector (Ref. 36-11-47) (Ref. Fig. 401).

(5) Remove pylon ventilation tube between PS 218 and PS 99 as necessary (Ref. 54-11-01).

(6) Disconnect ejector intermediate-pressure inlet control line.

(7) Disconnect temperature sensor inlet line.

(8) Disconnect electrical connector from forward end of ejector.

(9) Disconnect INTERMEDIATE PRESSURE air duct couplings at both ends of Anti-Ice check valve and lower it to firewall panel.

(10) Remove lock wire securing coupling cover (Ref. 20-00-06).

(11) Remove split insulating cover from high-pressure inlet duct connector, located below ejector.

(12) Remove HP duct couplings from the ejector (Ref. 20-36-02).

(13) Remove coupling of aft end of ejector.

(14) Remove bolt from the link on the left side of the ejector and move link out of the way.

(15) Remove bolts from ejector right side lug assembly and upper link attachment. Retain parts for reuse when installing another ejector.

CAUTION: THE EJECTOR WEIGHS APPROXIMATELY 70 POUNDS.

DO NOT LEAN, SIT, OR PRY ON FUEL LINE TO PREVENT DAMAGE.

(16) Using appropriate overhead hoisting equipment raise the forward end of the ejector, to clear the high-pressure duct flange, and move the ejector forward to clear the nozzle plug in outlet duct.

CR (17) Deleted

(18) Remove the seals from the ejector inlet and outlet duct flanges, retain for reuse if not damaged.

(19) Install protective covers on ducts.

C NOTE: Do not remove insulation from ejector. The
C ejector is to be returned for overhaul with the
C insulation installed.

B. Wing Engine Ejector - Installation

(1) Verify that tags installed in Step 4A(1) on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify that circuit breakers opened in Step 4A(2) are open and tagged.

C (3) Deleted.

(4) Install ejector right side linkages (Ref. Fig. 401).

(5) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(6) Install high pressure duct seals in the high-pressure duct flange and the ejector intermediate-pressure inlet and outlet duct flanges.

CAUTION: THE EJECTOR WEIGHS APPROXIMATELY 70 POUNDS.

CARE MUST BE USED IN PLACING THE EJECTOR IN THE PYLON TO PREVENT DAMAGE TO THE HIGH-PRESSURE DUCT FLANGE FACE, SEAL, OR EJECTOR FLANGES.

DO NOT LEAN, SIT, OR PRY ON FUEL LINE TO PREVENT DAMAGE.

(7) Place the ejector in position in the pylon (outlet duct and plug aft).

NOTE: It may be necessary to use a wood or micarta block approximately 30 inches long, 3-3/4 inches high, and 1-3/4 inches wide to assist in connecting ducts.

(8) Install couplings (Ref. 20-36-02) around ejector and high-pressure inlet duct connections.

(9) Install couplings around ejector inlet outlet connection.

(10) Attach side links to the ejector and pylon structure using bolts removed previously.

(11) Install split insulating cover over high-pressure inlet duct clamp and lock-wire.

(12) Install INTERMEDIATE PRESSURE AIR duct and high pressure duct seal.

(13) Connect ejector intermediate-pressure inlet control and temperature sensor inlet lines.

(14) Connect electrical connector to the ejector.

(15) Install pylon ventilation tube. Replace seals as necessary [Ref. Step 4A(5)].

(16) Install starter duct sections (Ref. 36-11-47).

(17) Install applicable access panels removed in Step 4A(3).

(18) Remove tag and close circuit breaker opened in Step 4A(2).

(19) Remove placards installed in Step 4A(1).

(20) Perform mixing ejector operational test (Ref. 36-11-08) on ejector that was replaced.

C. Center Engine Ejector - Removal

(1) Tag Flight Engineer/Second Officers (FE/SO) engine bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14).

(3) Remove power plant access panels 471DL (on left side) and 471CR (on right side) (Ref. Fig. 402).

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVE SHOULD BE USED WHEN REQUIRED.

(4) Disconnect intermediate-pressure (IP) inlet control line.

(5) Disconnect temperature sensor inlet line.

(6) Disconnect electrical connector from mixing ejector.

(7) Move counterweight to center of mixing ejector handling beam.

(8) Attach hoist cable to three-point sling of handling beam, with clamp end toward aircraft. Adjust counterweight as required.

(9) Carefully swing handling beam through left side access opening and secure ejector with clamp.

(10) Move counterweight to end of handling beam.

(11) Remove double T-bolt V-band couplings (Ref. 20-36-02) which connect mixing ejector to IP duct on inlet side, HP duct below ejector, and outlet T-duct on other side of ejector.

(12) Remove bolts from linkage on right side of ejector and move linkage out of way.

(13) Remove bolt from link on left side of ejector and move link out of way.

CAUTION: THE EJECTOR WEIGHS APPROXIMATELY 70 POUNDS.

(14) Using handling beam, raise inlet end of ejector to clear HP duct flange and move ejector aft to clear nozzle plug in outlet end.

(15) Carefully swing out handling beam holding ejector.

(16) Install protective covers on ducts.

(17) Remove ejector from handling beam clamp.

(18) Adjust counterweight as required.

(19) Remove linkage from right side of ejector, for re-use when installing another ejector. Remove seals from the ejector inlet and outlet duct flanges.

D. Center Engine Ejector - Installation

(1) Verify that tags installed in Step 4C(1) on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify circuit breakers listed in Step 4C(2) are open and tagged.

(3) Install ejector right side linkages.

(4) Remove protective covers from ducts and inspect ducts for cleanliness and condition. Install seals in HP duct flange, mixing ejector IP inlet flange, and outlet T-duct flange.

(5) Ensure that handling beam is attached to hoist as noted in Steps 4C(8) and 4C(9).

(6) Place ejector into handling beam clamp.

Adjust counterweight as required.

(7) Carefully swing in handling beam through left side access and place ejector in position (nozzle plug forward).

(8) Attach side links to the ejector and structure.

(9) Install couplings (Ref. 20-36-02) around ejector sides and HP inlet duct flanges.

(10) Move counterweight to center of handling beam.

(11) Release clamp on ejector.

(12) Carefully swing handling beam out of aircraft, lower and disconnect from hoist cable.

(13) Remove support frame from left side of aircraft.

(14) Connect IP inlet control line and temperature sensor inlet line.

(15) Connect electrical connector to ejector.

(16) Install access panels removed in Step 4C(3).

(17) Remove tag and close circuit breaker opened in Step 4C(2).

(18) Remove placards installed in Step 4C(1).

(19) Perform mixing ejector operational test procedures (Ref. 36-11-08) on ejector.

5. Removal Installation - Air Filter

A. Removal

(1) Placard Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On the pilots overhead circuit breaker panel CB1, zone 210, open and tag the following applicable circuit breaker:

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15).

(3) Remove pylon access panels 452AT, 452BT, and 452CT for engine No. 1, 462AT, 462BT, and 462CT for engine No. 3, 471DL (on left side) and 471CR (on right side) for engine No. 2 (6-40-00).

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

CAUTION: HEX PLUG IS SPRING LOADED.

(4) Remove hex plug, spring and filter, separate preformed packing from plug.

(5) Inspect preformed packing, if damaged replace packing (Hamilton Standard P/N 69494J910).

B. Installation

(1) Verify that tags installed in Step 5A(1) on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

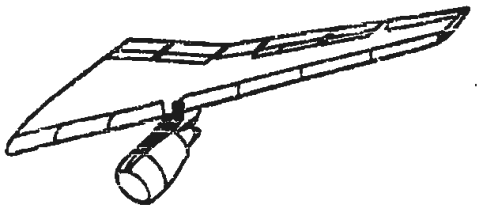
CAUTION: FILTER MUST BE INSTALLED FLANGED END FIRST (REF. FIG. 403).

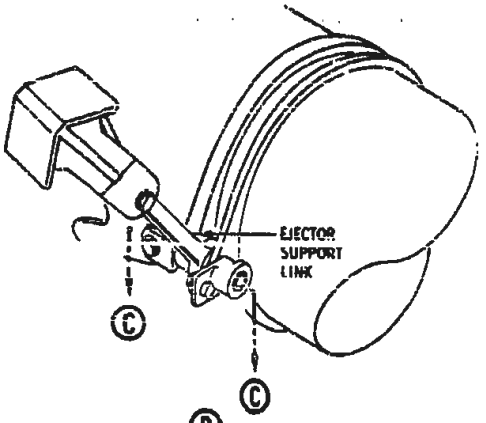
(2) Install filter (flanged end first) and spring in housing.

(3) Install preformed packing on plug. Coat plug threads with anti-seize compound and install in housing. Torque to 25-30 pound inches.

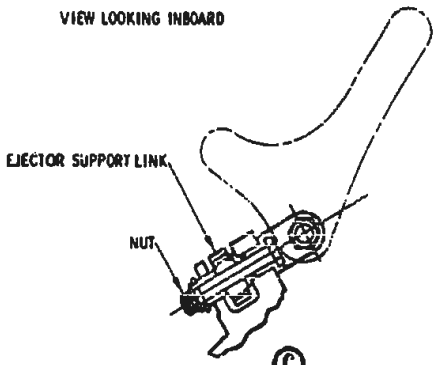
(4) Close access panels opened in Step 5A(2)

(5) Remove WARNING tags installed in Step 5A(1).

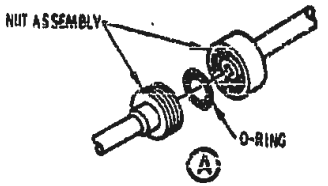




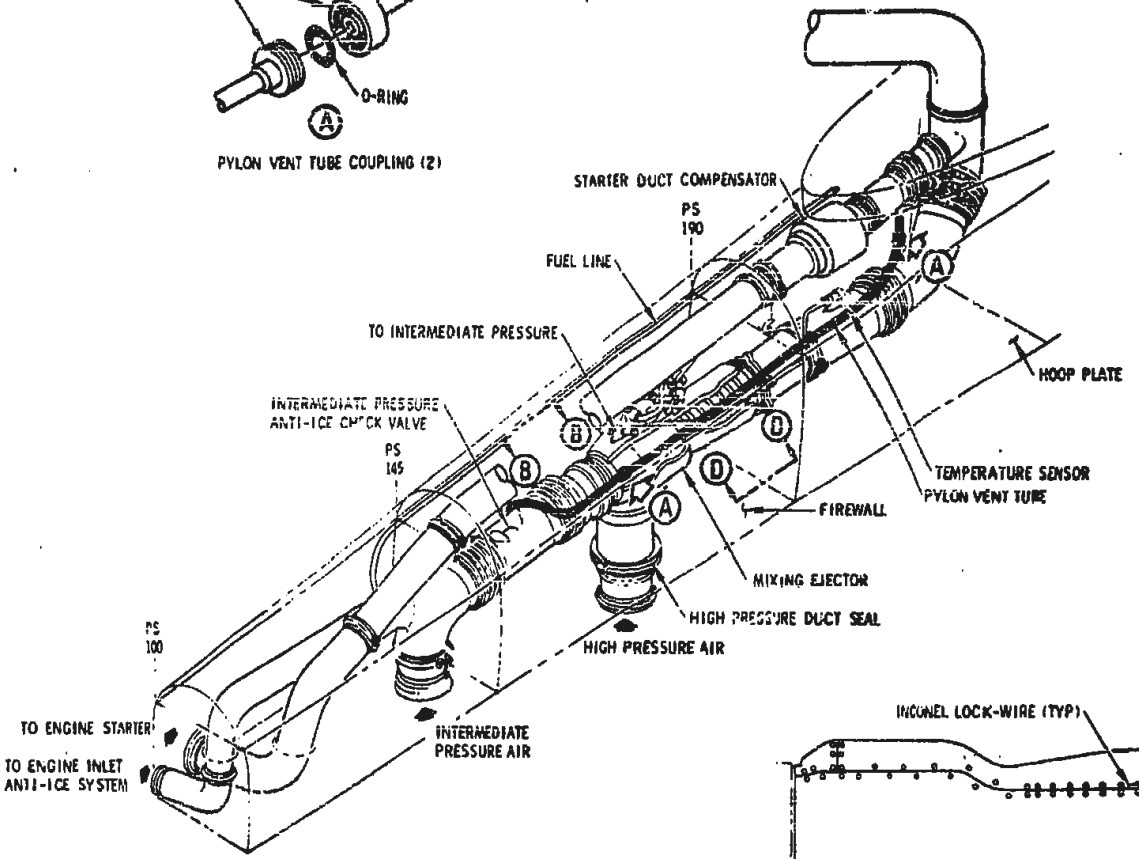
VIEW LOOKING INBOARD

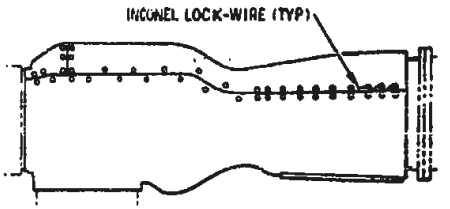


VIEW LOOKING DOWN



PYLON VENT TUBE COUPLING (2)





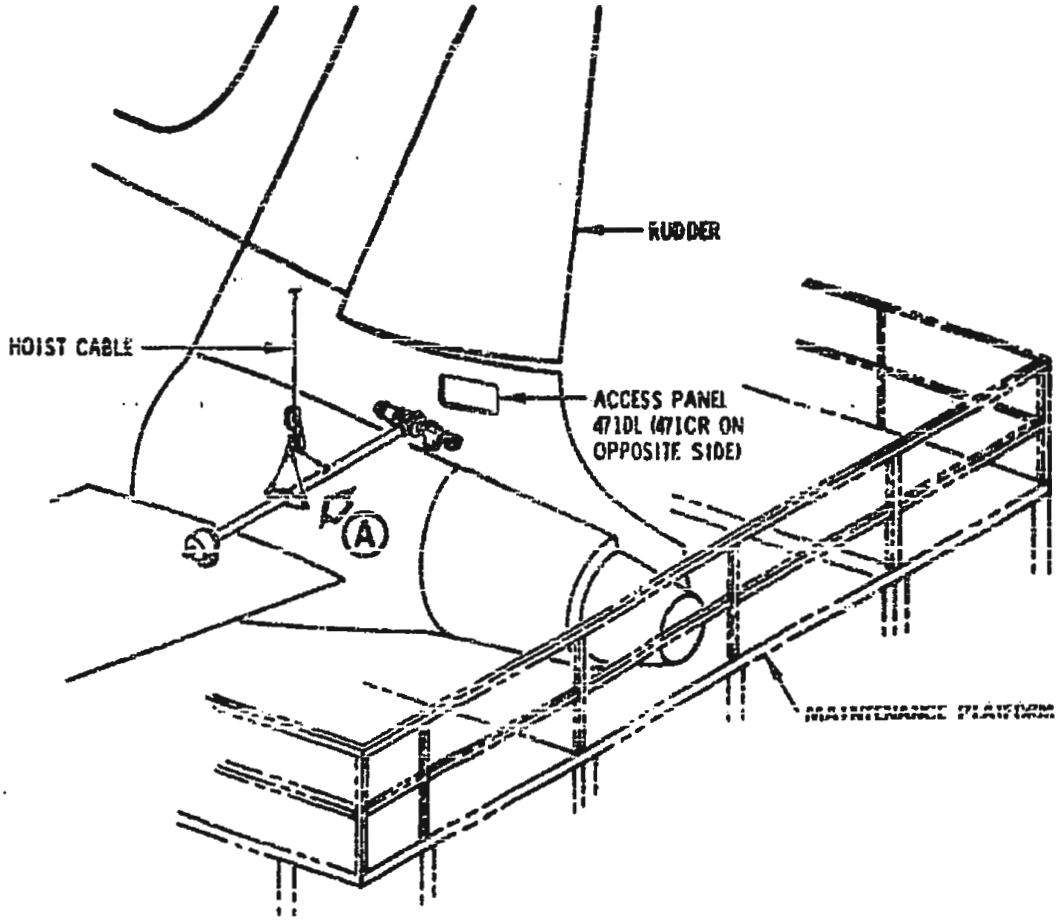
VIEW LOOKING UP AND INBOARD

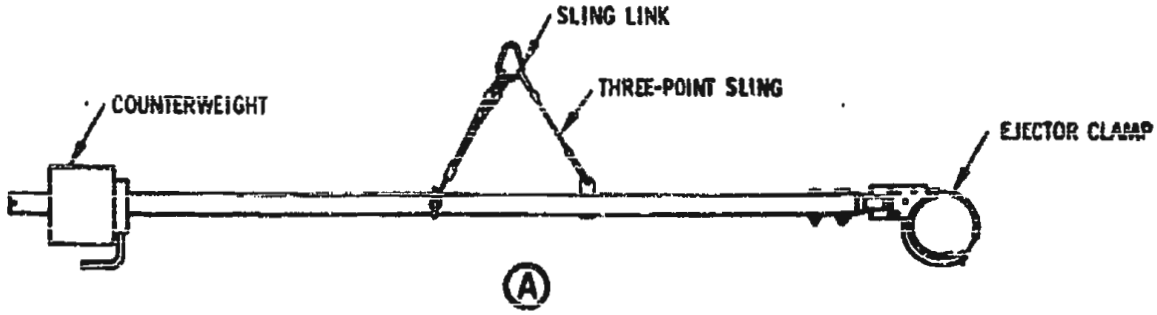
M1-0001-36-023

R Wing Engine Bleed Air System Installation
R Figure 401

EFFECTIVITY: ALL

0018

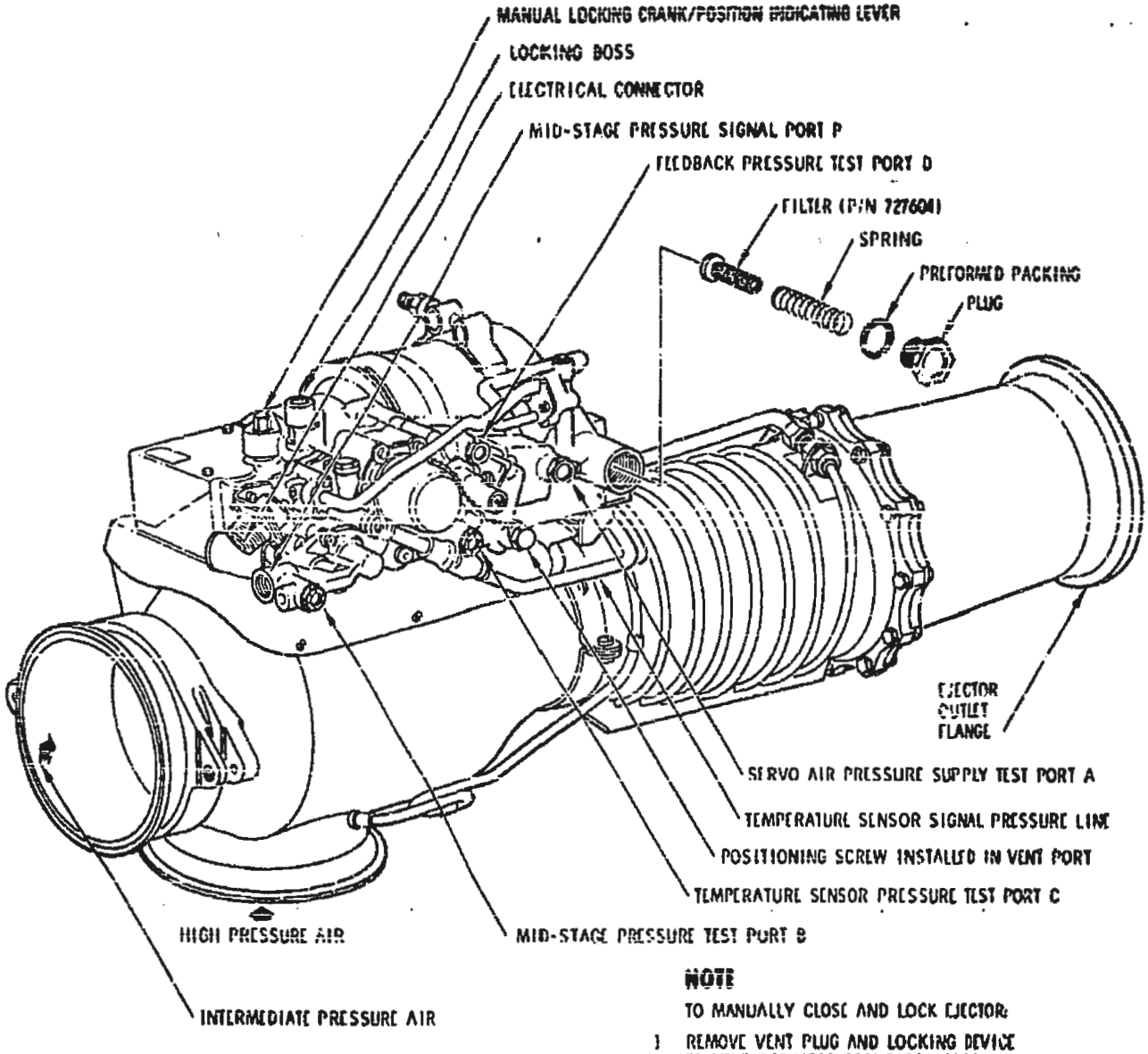




MIXING EJECTOR HANDLING BEAM, 6A03

MI-0101-34-072

Engine No. 2 Mixing Ejector - Removal and Installation
Figure 402



NOTE

TO MANUALLY CLOSE AND LOCK EJECTOR:

1. REMOVE VENT PLUG AND LOCKING DEVICE TO VENT ACTUATOR SERVO PRESSURE
2. USE 1/2 INCH WRENCH ON MANUAL OVERRIDE TO ROTATE POSITION INDICATOR AND MANUAL LOCK LEVER TO "LOCK CLOSED" POSITION
3. INSERT VENT PLUG AND MANUAL LOCKING DEVICE INTO LOCKING BOSS THROUGH LEVER AND TIGHTEN

M1-0003-36-016

R
R

Bleed Air Mixing Ejector
Figure 403

MIXING EJECTOR - ADJUSTMENT AND TEST

1. General

Field adjustment of the engine mixing ejector is not recommended. Test procedures are the same for No. 1, 2 and 3 engine mixing ejectors, except for circuit breakers and access panels.

2. Equipment and Materials

Valve Tester, Hamilton Standard GS 9400-7, or equivalent

Test Plug, Hamilton Standard GS 14099-1 or GS 13841-1 (2 required), or equivalent

Test Plug, Hamilton Standard GS 14123-1 or GS 14111-1, or equivalent

R Test Plug, Hamilton Standard GS 19613-1, or equivalent

Test Plug, Hamilton Standard GS 14849-1 or equivalent for LAC P/N 672274-109 or -111 (HS P/N 739064-6, -7, -8 or -9) ejector models which do not contain a midstage signal test port.

Digital Multimeter, John Fluke Mfg. Co. 8024A or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

6-40-00	Exterior Access Doors and Removable Panels
24-00-00	Electrical Power System - Maintenance Practices
36-11-47	Wing Engine Starter Duct - Removal and Installation
71-00-00	Power Plant - Adjustment and Test

4. Adjustment/Test

A. Operational Test

(1) Preparation

(a) Turn on electrical power (Ref. 24-00-00).

(b) On pilots overhead circuit breaker panel CB1, zone 210, verify that following applicable circuit breakers are closed:

ENGINE BLEED CONTROL

ENG ISLN VALVES - ENG 1, 2, or 3 (G10, G11, G12)

HI PRESS VALVES - ENG 1, 2, or 3 (G13, G14, G15)

FUS ISLN VALVE (G16)

CROSSBLEED VALVES - L (G17)

CROSSBLEED VALVES - R (G18)

ECS SCHED - ENG NO. 1, NO. 3 (H8, H9) (Aircraft 028, 029)

ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL 1, 2, 3, and HI FLOW CONT (H3, H4, H5, H6)

(c) On Flight Engineer/Second Officers (FE/SO) aft circuit breaker panel CB3, zone 215, verify that circuit breaker ECS - IND LTS (G12) is closed.

(d) On FE/SO upper panel, ENGINE BLEED CONTROL panel, zone 215, (Ref. Fig. 501) depress the following switchlights and verify legend display:

R	HI PRESS (NO. 1, 2, or 3)	Flow bar off
R	ENG ISLN VALVE (NO. 1, 2, or 3)	Flow bar off
R	ISLN VALVE CROSS BLEED (two switchlights)	Flow bar off OFF
R	PACK FLOW CONTROL (three switchlights)	Flow bar off

(2) Test

NOTE: When testing any one engine system, be sure that one operable pack flow system is used and
R operational. All other bleed air or APU supplied bleed air must be isolated from the system under test.

(a) Start one engine (Ref. 71-00-00) then shutdown APU or remove high pressure ground air whichever was

used. Perform Steps 4A(2)(a) through 4A(2)(i) for each bleed air mixing ejector individually.

NOTE: For Steps 4A(2)(a) through 4A(2)(i), refer to Figure 502.

(b) At ground idle power setting verify the following:

ENG ISLN VALVE flowbar on

HI PRESS flowbar on

DUCT OVHT off

BLEED DUCT OVERPRESS off

Pressure reads below 55 psi.

(c) Slowly advance engine throttle.

At approximately 1.03 IEPR, verify that pressure on gauge reads between 30 to 44 psig.

(d) Slowly advance engine throttle, observe pressure reduction until minimum pressure is reached. Minimum pressure shall be between 19 and 28 psig, corresponding IEPR shall be between 1.07 and 1.10.

NOTE: If Per Cent N3 is used as a parameter, it should be corrected for temperature.

(e) On ECS Monitor Panel, set ECS temperature select to PACK INLET. Set PACK SELECT to pack being used.

(f) Slowly advance engine throttle. At 1.15 IEPR verify that PACK INLET temperature indicates less than 230°C (446°F).

CAUTION: IN STEP (g) DO NOT HOLD WING ANTI-ICE TEST BUTTON DEPRESSED FOR MORE THAN 60 SECONDS AT ANY ONE TIME. ALLOW AT LEAST 2 MINUTES INTERVAL BETWEEN ANTI-ICE OPERATIONS, IF WING ANTI-ICE OVHT LEGEND COMES ON, ALLOW COOLDOWN PRIOR TO CONTINUED USAGE OF TEST FUNCTION.

R

(g) Slowly advance engine throttle to IEPR 1.15. Verify Pack Inlet less than 230°C, or reduce IEPR to produce Pack Inlet less than 230°C. Latch in WING ANTI-ICE LEFT or RIGHT AUTO or MANUAL switchlight. Depress TEST button and verify Pack

Inlet temperature increases at least 260°C, but does not exceed 274°C.

NOTE: On days when ambient air temperature approaches or exceeds 100°F, engine temperatures may cause mixing ejector to operate in temperature control mode which prevents anti-ice operation. Anti-ice solenoid may be checked as part of the functional test, Paragraph 4B.

For temperatures between 50 to 100°F, PACK INLET will climb to between 250° to 274°C.

(h) Slowly advance engine throttle. Verify HI PRESS flowbar goes out between 1.2 and 1.3 IEPR.

(i) Turn off engine (Ref. 71-00-00).

(j) Return switchlights to pre-test positions.

(k) Turn off electrical power (Ref. 24-00-00).

B. Functional Test

(1) Tag Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of test.

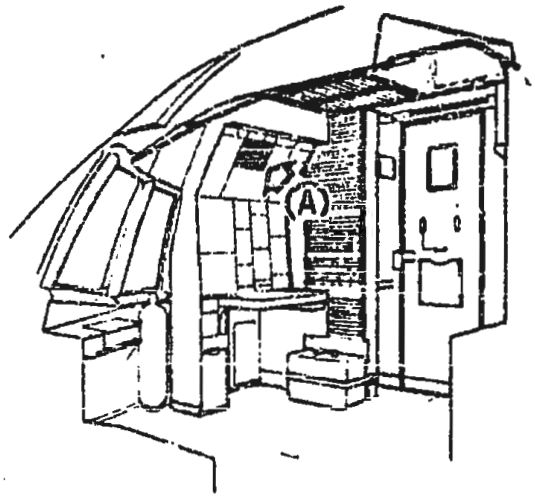
R R (2) Remove pylon access panels 452AT, 452FT, and 452GT for engine No. 1, and access panels 462AT, 462FT, and 462GT for engine No. 3 (Ref. 6-40-00).

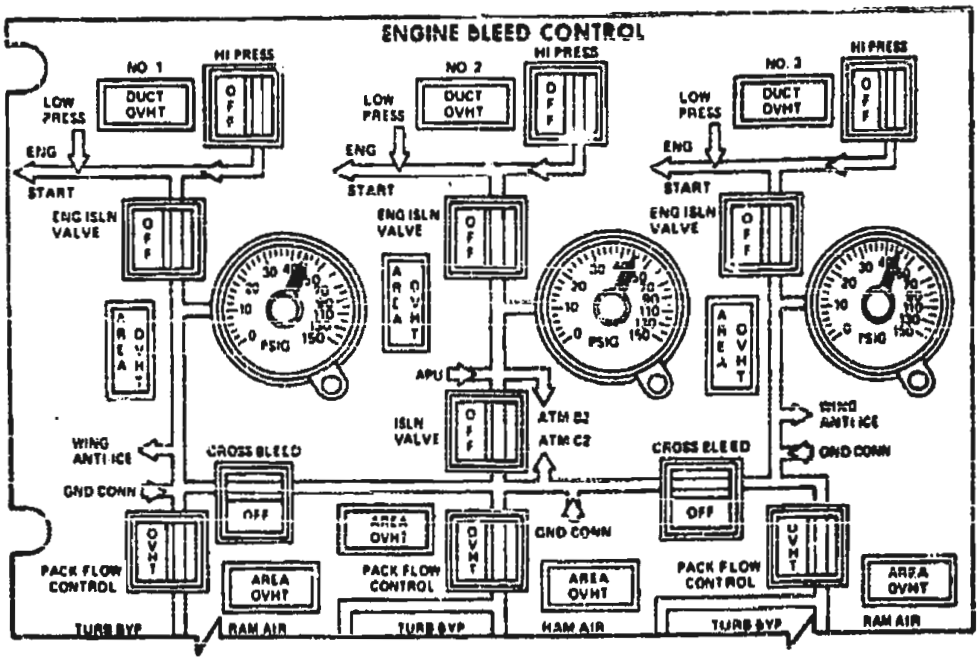
(3) Remove pylon access panel 471DL (on left side) and 471CR (on right side) for engine No. 2.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Set up Hamilton Standard valve tester GS9400-7 next to mixing ejector and connect 120-125 psi regulated air source (Ref. Fig. 503).

(5) Remove ground check plugs and install test plugs (GS 14099-4 or GS 13841-1, or equivalent) in ports A and B, and test plug (GS 14123-1 or GS14111-1, or equivalent) in port C. On ejector models P/N 672274-109 or -111 (HS P/N 739064-6, -7, -8 or -9) which do not contain a midstage signal test port, remove midstage line from





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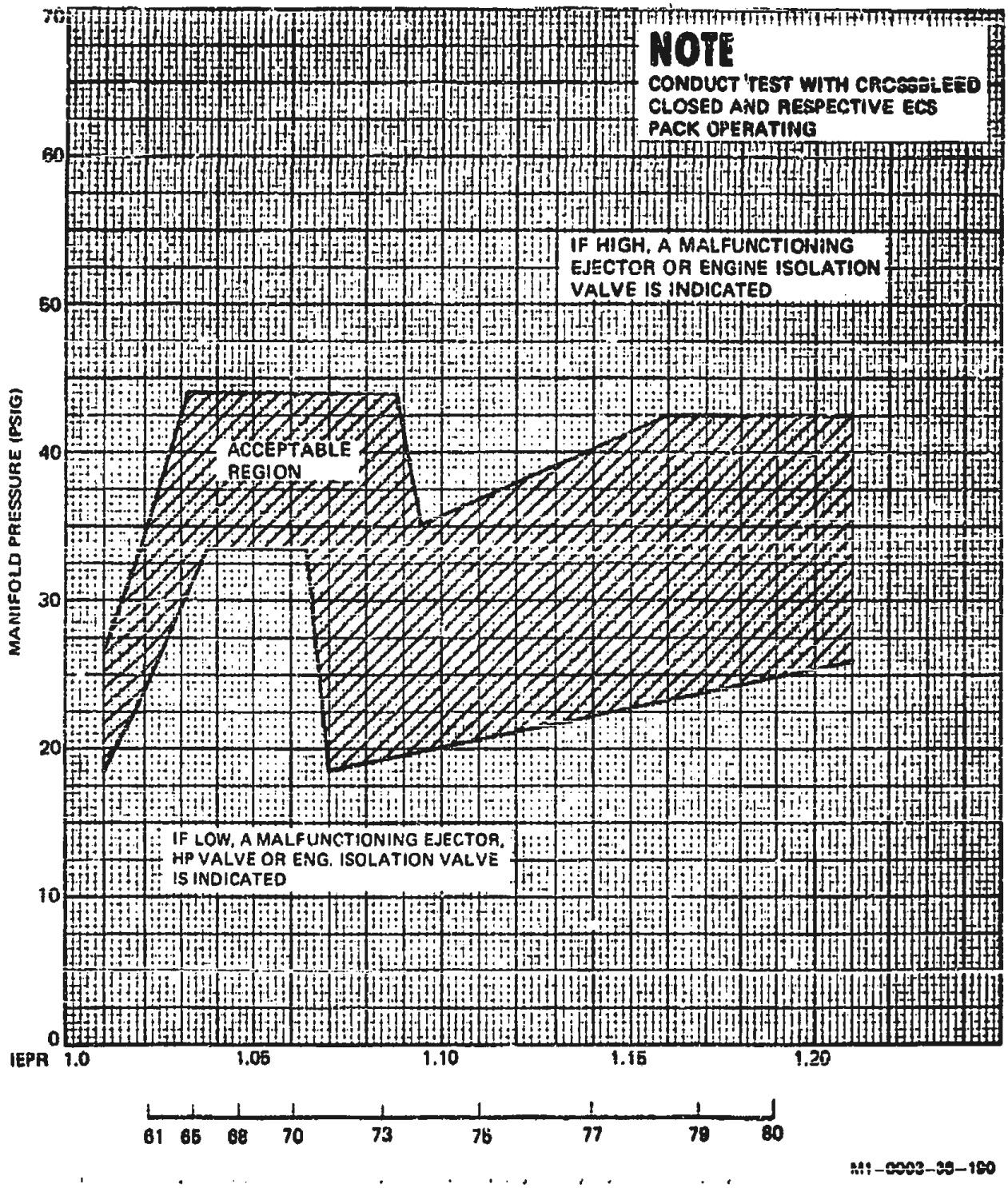
R
R

Engine Bleed Control Panel
Figure 501

EFFECTIVITY: ALL

001B



R Bleed Air System Parameters
R Figure 502 (Sheet 1)

EFFECTIVITY: ALL

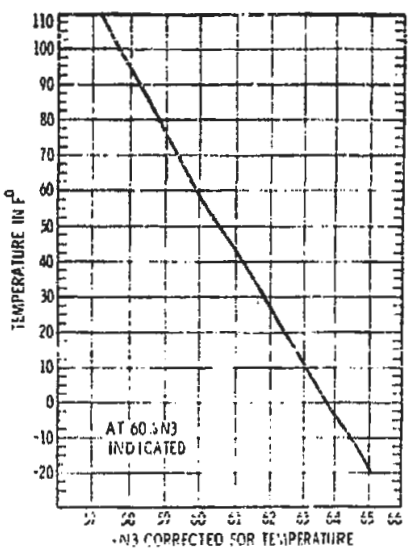
0016

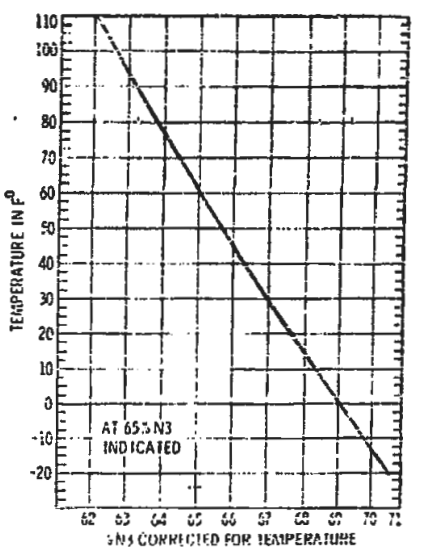
%N3 CORRECTION EQUATION

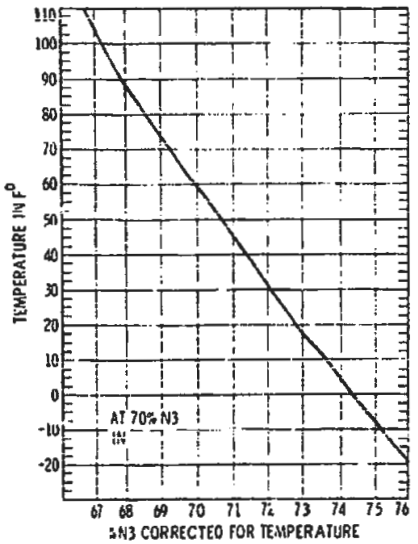
$$\theta = \frac{\text{LOCAL TEMP IN RANKINE}}{519}$$

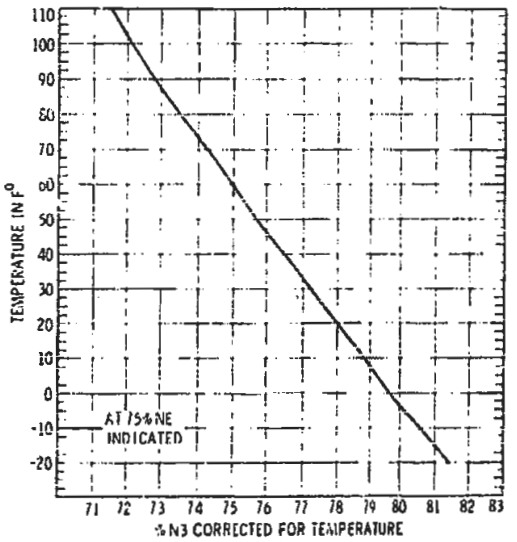
$$\text{CORRECTED \%N3} = \frac{\text{\%N3 INDICATED}}{\sqrt{\theta}}$$

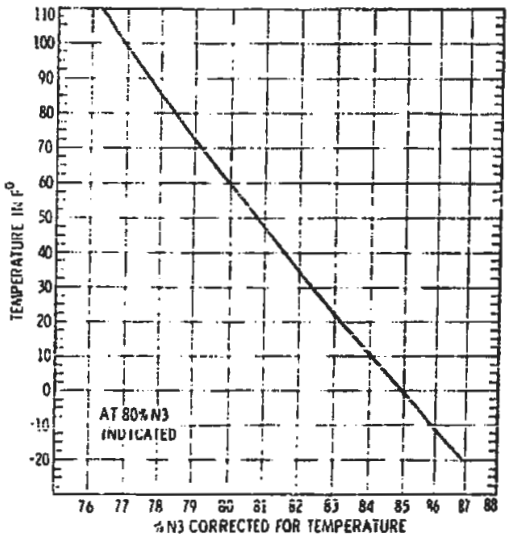
TO USE N3 AS A PARAMETER, INDICATED N3 SHOULD BE CORRECTED FOR LOCAL TEMPERATURE.











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R Bleed Air System Parameters
R Figure 502 (Sheet 2)

R EFFECTIVITY: ALL
R
0018

engine at the ejector and install fitting GS 14849-1 or equivalent.

(6) Turn on electrical power (Ref. 24-00-00).

(7) Apply the following pressures:

(a) 60 psig to test port A

(b) 35 psig to test port B

(c) 14 to 16 psig to test port C

Ejector nozzle must close. Verify that position indication lever points to lock CLOSED position.

(8) Slowly decrease pressure at port B between 12 and 14 psig. Verify that position indication lever moves smoothly to OPEN position.

(9) Decrease pressure at port C between 3 and 5. Verify that position indication lever points to lock CLOSED position.

(10) Increase pressure at port C between 14 and 16 psig. Verify that position indication lever moves smoothly to OPEN position.

(11) Slowly increase pressure at port B to 35 psig. Verify that position indicator lever points to lock CLOSED position.

(12) Relieve all pressure on valve tester.

(13) Remove GS14123-1 or GS14111-1 test plug from port C. Install GS14098-1 test plug in ports C and D.

(14) Apply a pressure of 26 psig to port A. Pressure measured at port C must be 21 psig minimum. Feedback pressure at port D shall be 14 to 20 psig. Record pressure at port D. Verify ejector position indication lever points to OPEN position.

(15) Decrease pressure to port A to 17 psig, and apply 44 to 46 psig to port B. Verify ejector position indication lever points to lock CLOSED position and pressure at port C reads 11 to 15 psig. Feedback pressure at port D reads 2 to 6 psig. Record pressure at port D. The change in pressure at port D between the readings recorded in Steps (14) and (15) must be 10 to 16 psig.

(16) Increase pressure at port A to 90 psig. Pressure at port C shall now read 30 to 38 psig. Verify ejector position indication lever stays to lock CLOSED position.

(17) Verify HI PRESS switchlight is latched in. Latch in WING ANTI-ICE LEFT or RIGHT AUTO or MANUAL switchlight. Depress WING ANTI-ICE TEST button. Ejector nozzle must open fully. Verify that position indication lever points to OPEN position.

(18) Release WING ANTI-ICE TEST button. Verify ejector position indication lever points to lock CLOSED.

(19) Remove applied pressures.

(20) Remove all test adapters and reinstall ground check plugs.

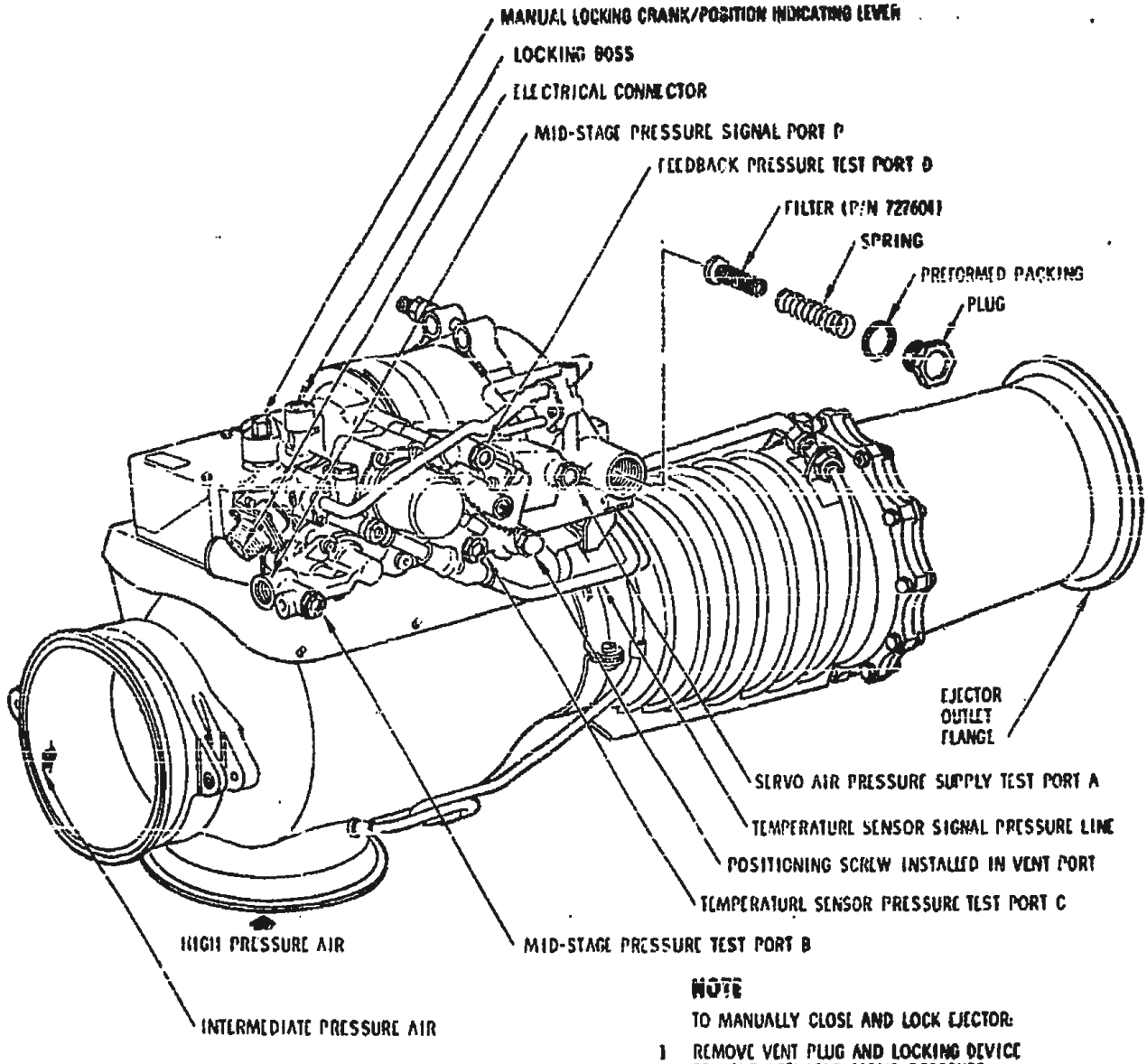
(21) Torque plugs 10 to 15 lb in.

(22) Secure with lockwire.

(23) Turn off electrical power (Ref. 24-00-00).

(24) Install pylon access panel.

(25) Remove tags installed at Step 4B(1).



NOTE

TO MANUALLY CLOSE AND LOCK EJECTOR:

1. REMOVE VENT PLUG AND LOCKING DEVICE TO VENT ACTUATOR SERVO PRESSURE
2. USE 1/2 INCH WRENCH ON MANUAL OVERRIDE TO ROTATE POSITION INDICATOR AND MANUAL LOCK LEVER TO "LOCK CLOSED" POSITION
3. INSERT VENT PLUG AND MANUAL LOCKING DEVICE INTO LOCKING BOSS THROUGH LEVER AND TIGHTEN

M11-0003-00-016

R Engine Mixing Ejector - Location of Test Ports
R Figure 503

MIXING EJECTOR
INSPECTION AND CHECK

1. General

Units with obvious or unreparable damage should be removed and sent to overhaul.

2. Referenced Procedure

R 36-11-08 Mixing Ejector - Removal and Installation

36-11-08 Mixing Ejector - Cleaning and Painting

3. Inspection/Check

A. Inspection

(1) Inspect electrical connector for broken pins or other damage.

(2) Inspect inlet and outlet flanges for nicks, dents, or other damage.

R (3) Remove mixing ejector air filter (Ref. 38-11-08 Removal
R and Installation, Paragraph 5).

(4) Inspect filter for clogged or dirty pores.

(5) If required, clean dirty or clogged filter (Ref. 36-11-08) Cleaning and Painting).

R (6) Reinstall mixing ejector air filter.

MIXING EJECTOR
CLEANING AND PAINTING

1. Equipment and Materials

   Soft-bristle brush

   Petroleum Solvent, Spec AMS3160B, or equivalent

   Lint-free cloth

2. Referenced Procedure

   36-11-08 Mixing Ejector - Inspection and Check

3. Cleaning/Painting

   A. Cleaning

      WARNING: USE PETROLEUM SOLVENTS ONLY IN A WELL-VENTILATED AREA AND WITH PROPER PRECAUTIONS TO PREVENT FIRE. WEAR GOGGLES WHEN USING COMPRESSED AIR TO DRY PARTS.

      CAUTION: USE COMPRESSED AIR CAREFULLY ON FINE-MESH FILTER SCREEN TO PREVENT DAMAGE.

R R (1) Clean dirty or clogged filter (Ref. 36-11-08, Inspection and Check) with solvent. Use a soft-bristle brush or immerse and agitate filter in solvent.

      (2) Clean all exterior surfaces of valve with a lint-free cloth dampened in solvent.

      (3) Dry unit with dry, filtered, compressed air.

R R # BLEED AIR TEMPERATURE SENSOR MAINTENANCE PRACTICES

R 1. General

R The bleed air temperature sensors are pneumatic thermostats and R control the operation of the mixing ejectors.

R 2. Referenced Procedure

R 36-11-01 Engine High-pressure Valve - Maintenance Practices

R 3. Maintenance Practices

R A. Deactivation

R (1) Deactivate engine high-pressure valve on engine with R R inoperative bleed air overtemperature switches (Ref. R 36-11-01).

R R (2) On Flight Engineer/Second Officers ENGINE BLEED CONTROL R panel, zone 215, placard applicable HI PRESS R switchlight OVERTEMP SWITCH INOPERATIVE, HI PRESS VALVE R DEACTIVATED.

R (3) Make appropriate entry in aircraft log book.

BLEED AIR TEMPERATURE SENSOR REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for No. 1, No. 2, and No. 3 engine bleed air temperature sensors, except for circuit breaker and access panel references. The wing engine (No. 1 and No. 3) bleed air temperature sensors are located in the pylon ducting, downstream of the ejector, zones 452 and 462 (Ref. Fig. 401). The center engine (No. 2) bleed air temperature sensor is located in the center engine support structure, zone 471, (Ref. Fig. 401). To remove the wing engine temperature sensors, it is necessary to first remove the starter duct compensator.

2. Referenced Procedure

36-11-11 Bleed Air Temperature Sensor - Adjustment and Test

36-11-27 Wing Engine Starter Duct Compensator - Removal and Installation

3. Removal/Installation

R A. Removal

R WARNING: PLACARD FLIGHT ENGINEER/SECOND (FE/SO) OFFICERS BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel CB1, zone 210,
R open and tag the following circuit breaker as
R applicable:

R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14),

R ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15).

(2) Remove pylon access panels 452BT and 452CT for engine No. 1 sensor or 462BT and 462CT for engine No. 3 sensor. Remove center engine support structure access panel 471AL for engine No. 2 sensor.

R (3) Engines No. 1 or No. 3:
R Remove wing engine starter duct compensator (Ref. 36-11-27).

(4) Release nut securing servo air hose to adapter.

(5) Remove adapter and seal from pneumatic connection, and retain for use when installing another sensor.

(6) Remove mounting bolts and washers securing sensor mounting flange to duct boss.

(7) Raise sensor until sensing probe clears duct and remove sensor and seal. Retain seal for use when installing another sensor.

(8) Install protective cover on duct boss.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Inspect seal for damage, replace if necessary. Install seal on sensor mounting flange.

R CAUTION: REMOVE PLASTIC CAP FROM SENSOR PORT IF INSTALLED (SEE FIGURE 401).

(3) Remove protective cover from duct boss. Insert sensor probe into duct and lower sensor mounting flange onto duct boss.

(4) Secure sensor with mounting bolts and washers.

(5) Inspect seal for damage, replace if necessary. Install seal in pneumatic connection.

(6) Connect adapter to pneumatic connection.

(7) Connect hose to adapter and secure with nut.

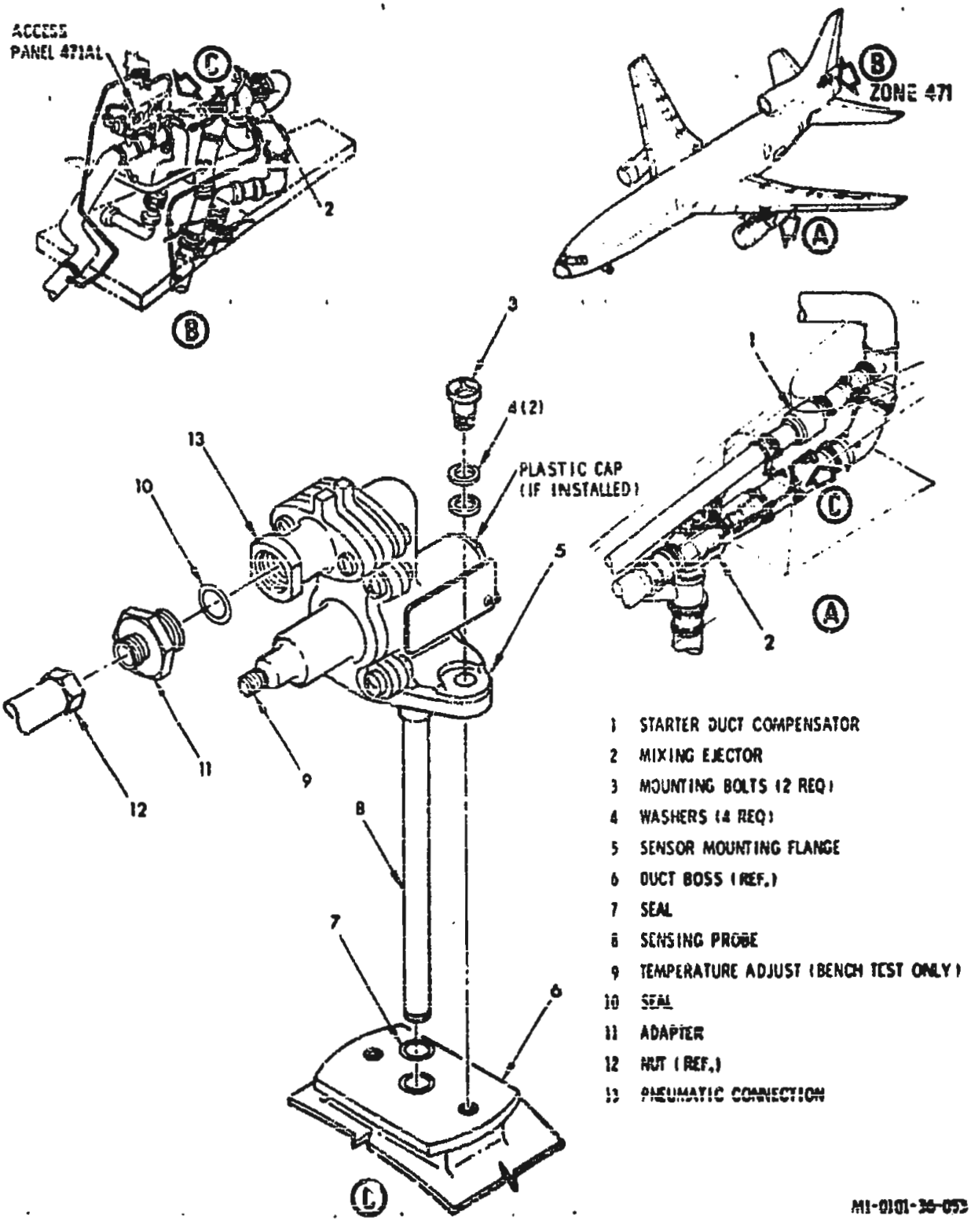
R (8) Engine No. 1 or 3 :
R Install starter duct compensator (Ref. 36-11-27).

(9) Install access panel(s) removed in Step 3A(2).

(10) Remove tag and close circuit breaker opened in Step 3A(1).

(11) Remove placards installed in Paragraph 3.

(12) Perform bleed air temperature sensor operational test procedures (Ref. 36-11-11) on sensor that was replaced.



Bleed Air Temperature Sensor - Removal and Installation
Figure 401

R BLEED AIR TEMPERATURE SENSOR - ADJUSTMENT AND TEST

1. General

Field adjustment of the bleed air temperature sensor is not recommended. The test procedure is the same for the No. 1, No. 2, and No. 3 engine bleed air temperature sensors, except for access panels.

2. Referenced Procedures

21-63-00	Air Conditioning Temperature Control Indicating and Monitoring System - Maintenance Practices
24-41-00	External Power/Ground Service System - Maintenance Practices
30-13-00	Wing Anti-ice System - Maintenance Practices
80-11-00	Engine Starting System - Maintenance Practices

3. Adjustment/Test

A. Operational Test

(1) Preparation

(a) Turn on electrical power (Ref. 24-41-00).

(b) On pilots overhead circuit breaker panel CB1, zone 210, verify that the following applicable circuit breakers are closed:

ENGINE BLEED CONTROL

R ENG ISLN VALVES - ENG 1 (G10), 2 (G11), or 3
R (G12)

R HI PRESS VALVES - ENG 1 (G13), 2 (G14), or 3
R (G15)

R FUS ISLN VALVE (G16)

R CROSSBLEED VALVES - L (G17), R (G18)

R ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL - 1
R (H3), 2 (H4), 3 (H5), and HI FLOW CONT (H6)

(c) On Flight Engineer/Second Officers (FE/SO) aft circuit breaker panel CB3, zone 215, verify that circuit breaker ECS-IND LT (G12) is closed.

R (d) On FE/SO overhead circuit breakers panel CB2, zone 215, verify that circuit breaker WING - ANTI-ICE - CONT (D22) is closed.

(e) On pilots overhead panel, WING ANTI-ICE panel, R zone 210, latch in LEFT-AUTO or RIGHT-AUTO switchlight and verify that ON legend comes on (Ref. 30-13-00).

(f) On FE/SO upper panel, ENGINE BLEED CONTROL panel, R zone 215, latch the following applicable switchlights and verify legend display:

HI PRESS (NO. 1, 2, or 3)	Flow bar off
ENG ISLN VALVE (NO. 1, 2, or 3)	Flow bar off
ISLN VALVE	Flow bar off
CROSS BLEED (two switchlights)	OFF
PACK FLOW CONTROL (three switchlights)	Flow bar off

(2) Test

(a) Start applicable engine and run at idle speed (Ref. 80-11-00).

(b) Increase engine power setting until pressure indicator on ENGINE BLEED CONTROL panel displays 35 psig.

(c) On FE/SO upper panel, ECS MONITOR panel, zone 215, select the applicable pack number and pack inlet temperature probe (Ref. 21-63-00). Verify that R ECS temperature indicator stabilizes below 230°C.

CAUTION: IN STEP (d), DO NOT HOLD WING ANTI-ICE TEST BUTTON DEPRESSED FOR MORE THAN 60 SECONDS AT ANY ONE TIME. ALLOW AT LEAST 2 MINUTES R INTERVAL BETWEEN ANTI-ICE OPERATIONS. IF R WING ANTI-ICE OVERHEAT LEGEND COMES ON, ALLOW COOL DOWN PRIOR TO CONTINUED USAGE OF TEST FUNCTION.

(d) On pilots overhead panel, WING ANTI-ICE panel, depress and hold TEST switch. Verify that ECS R temperature indicator rises at least 15°C, but R does not exceed 274°C.

R (e) Release TEST switch. Verify that ECS temperature indicator drops below 230°C.

(f) Turn off engine (Ref. 80-11-00).

(g) Return circuit breakers and switchlights to pre-test positions.

(h) Turn off electrical power (Ref. 24-41-00).

BLEED AIR OVERTEMPERATURE SWITCH - MAINTENANCE PRACTICES

1. General

The bleed air overtemperature switches are normally open thermal switches that close if bleed air temperature becomes excessive. There are two overtemperature switches in the bleed air duct downstream of each engine mixing ejector.

R The following procedures are concerned with:

R (1) One sequencing or overtemp switch in each bleed air R system may be inoperative. Maintenance action requires R the installation of a placard at the FE/SO station and R an entry in the log book.

R (2) One sequencing and overtemp switch in any one bleed air R system may be inoperative provided the high pressure R bleed air valve is physically deactivated closed or R maintained closed using the HI PRESS switchlight on the R FE/SO ENGINE BLEED CONTROL panel. Installation of a R placard and an entry in the aircraft log book is R required.

2. Referenced Procedure

36-11-01 Engine High-pressure Valve - Maintenance Practices

3. Maintenance Practices

A. Deactivation

R (1) One Sequencing or Overtemp Switch Inoperative In Each R Bleed Air System.

R (a) Install placard on FE/SO ENGINE BLEED CONTROL R panel, SEQUENCING (or OVERTEMP) SWITCH INOP IN R BLEED AIR SYS NO. .

R (b) Make appropriate entry in the aircraft log book.

R (2) Sequencing AND OVERTEMP Switch Inoperative In Any One R Bleed Air System.

R (a) Maintain the associated high pressure bleed air R valve closed. This requirement can be satisfied R by manually locking the valve closed as outlined R in the procedures for MEL Item No. 36-11-01 or

using the associated HI PRESS switchlight on the FE/SO ENGINE BLEED CONTROL panel.

(b) Install placard on the FE/SO ENGINE BLEED CONTROL panel to denote the action taken in Step (a), SEQUENCING AND OVERTEMP SWITCH INOP IN BLEED AIR SYS NO. . HP VALVE IN BLEED AIR SYS NO. . MANUALLY LOCKED OUT or SEQUENCING AND OVERTEMP SWITCH INOP IN BLEED AIR SYS NO. . MAINTAIN HP VALVE IN BLEED AIR SYS NO. CLOSED USING HI PRESS SWLT.

(c) Make appropriate entry in the aircraft log book.

BLEED AIR OVERTEMPERATURE SWITCH REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for No. 1, No. 2, and No. 3 engine bleed air overtemperature switches, except for circuit breaker and access panel references. The wing engine (No. 1 and No. 3) bleed air overtemperature switches are located in the pylon ducting, downstream of the ejector, zones 452 and 462, (Ref. Fig. 401). The center engine (No. 2) bleed air overtemperature switch is located in the center engine support structure, installed on the upper left side of the T-duct aft of the engine isolation valve, zone 471, (Ref. Fig. 402). To remove the wing engine overtemperature switches, it is necessary to first remove the starter duct compensator.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390. 0.032 diameter, or equivalent

3. Referenced Procedure

36-11-14 Bleed Air Overtemperature Switch - Adjustment and Test

36-11-27 Wing Engine Starter Duct Compensator - Removal and Installation

4. Removal/Installation

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1 (G10), ENG 2 (G11), or ENG 3 (G12) as applicable.

(2) Remove pylon access panel 452CT for engine No. 1 switch or 462CT for engine No. 3 switch. Remove center engine support structure left side access panel 471AL for engine No. 2 switch.

(3) Engine No. 1 or No. 3 only: Remove wing engine starter duct compensator (Ref. 36-11-27).

(4) Unscrew connector collar and disconnect plug connector from switch receptacle connector.

(5) Unscrew switch and raise out of duct.

(6) When probe clears duct, remove switch and seal. Retain seal for use when installing another switch.

(7) Install protective plug in duct boss.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Inspect seal for damage, replace if necessary. Install seal over switch probe.

(3) Remove protective plug and install probe in duct.

(4) Torque switch 340 to 500 lb in. and secure with lock wire.

CAUTION: ENSURE THAT CONNECTOR KEY AND SLOT ARE ALIGNED WHEN JOINING PLUG CONNECTOR TO RECEPTACLE CONNECTOR.

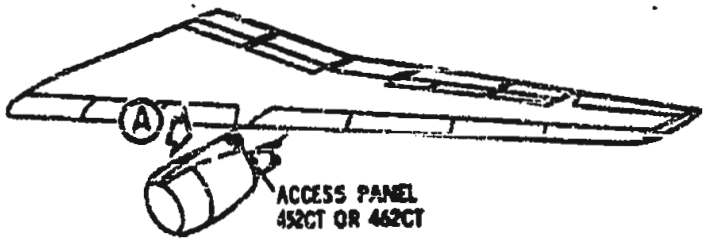
(5) Install plug connector and tighten connector collar.

(6) Engine No. 1 or No. 3 only: Install starter duct compensator (Ref. 36-11-27).

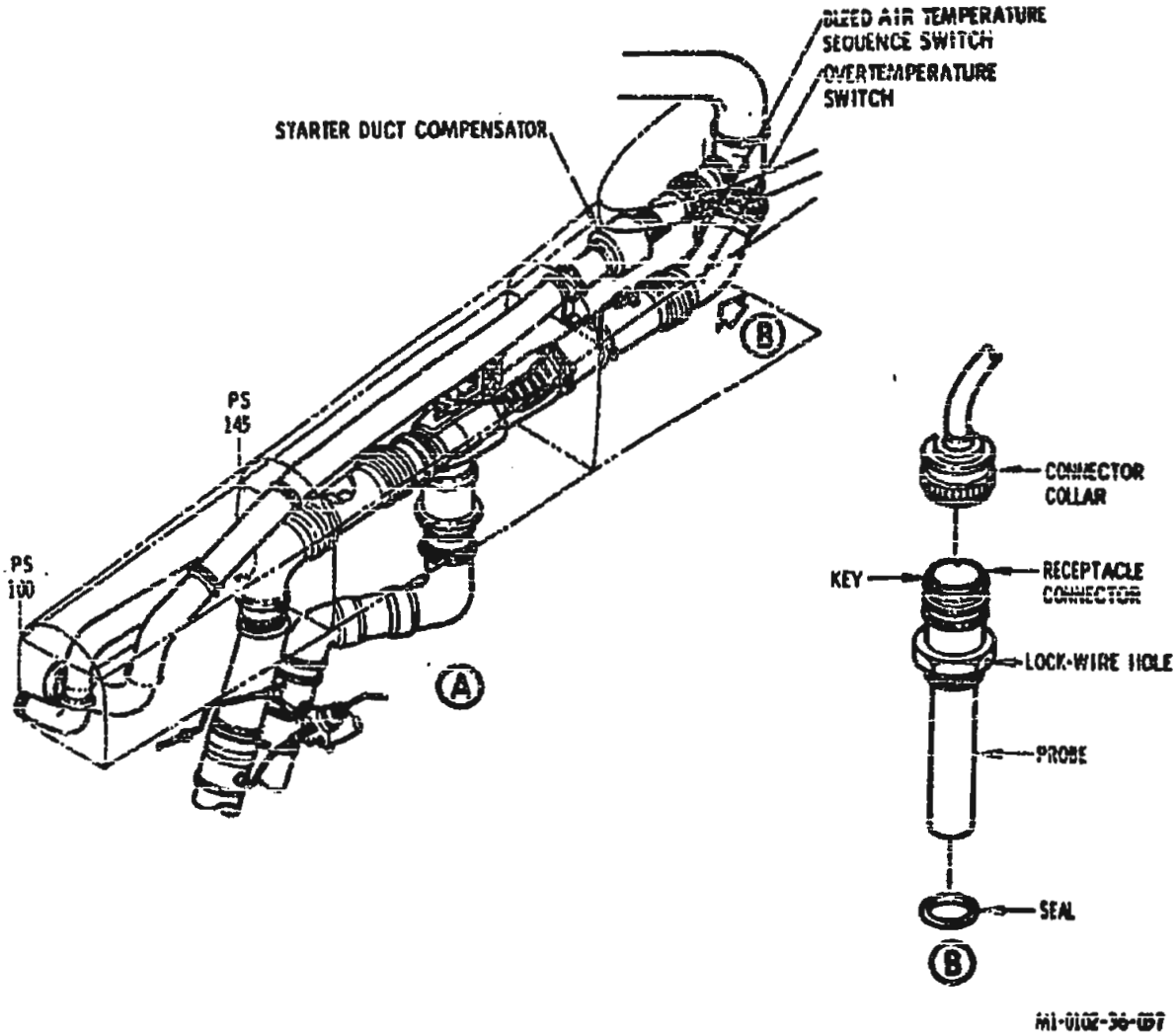
R (7) Remove tag and close circuit breaker opened in Step
R 4A(1).

R (8) Remove placards installed in Paragraph 4A.

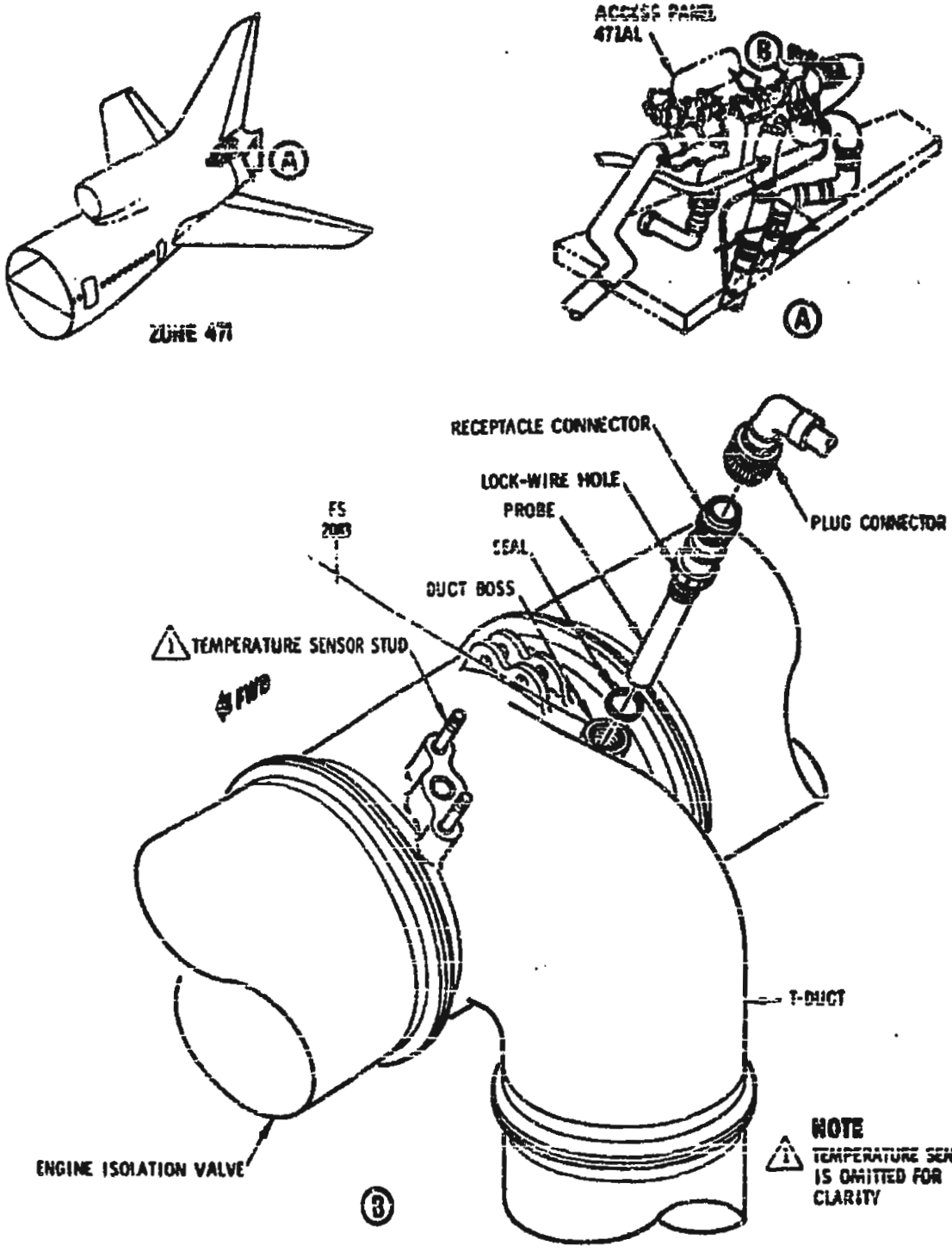
R (9) Install access panel removed in Step 4A(2).



ZONE 452 AND 462



R Wing Engine Overtemperature Switch
R Removal and Installation
R Figure 401



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Engine No. 2 Bleed Air Overtemperature Switch
Removal and Installation
Figure 402

BLEED AIR OVERTEMPERATURE SWITCH - ADJUSTMENT AND TEST

1. General

The overtemperature switches for the three engine bleed air systems are identical. The switch is nonadjustable on the aircraft. If the switch is suspected of malfunctioning, it should be replaced and sent to the shop for complete test.

2. Referenced Procedures

36-11-00 Engine Bleed Air System - Adjustment and Test

3. Adjustment/Test

A. Operational Check

R (1) Operational test not required.

B. Functional Check

(1) A functional check of the bleed air overtemperature switch must be performed in the shop.

ENGINE ISOLATION VALVE - MAINTENANCE PRACTICES

1. General

R Engine isolation valves are butterfly type pneumatically actuated valves used to isolate each engine bleed air system from the pneumatic distribution manifold system. The No. 1 and No. 3 engine isolation valves are in the wings over the pylons. The No. 2 engine isolation valve is in fuselage structure above that engine.

It may be necessary to manually open and lock an engine bleed air isolation valve to obtain pneumatic pressure from the distribution manifold system to start an engine with an inoperative valve.

R The operation steps are presented in the order in which they
R will be completed. The Operating Procedure (Ref. MMEL
R Procedures Manual, Item 36-11-18) determines that the fault is
R in the electrical system. Steps 3A and 3B are to be completed
R if Operation Procedure does not result in a good engine start.

2. Referenced Procedure

71-00-00 Power Plants - Adjustment and Test

R 3. Maintenance Practices

R A. Activation - Mechanical

R NOTE: If flight crew is unable to open engine isolation valve
R they will notify ground crewman to manually open engine
R isolation valve.

R WARNING: WEAR PROTECTIVE GLOVES WHEN WORKING ON BLEED AIR
R SYSTEM WITH ENGINE RUNNING.

R (1) Open appropriate access panel, No. 2 Engine 511LB-3,
R No. 2 Engine 471AL, or No. 3 Engine 611LB-3 (Ref. Fig.
R 201).

R (2) Use 7/16-inch wrench to remove manual vent plug from vent port (Ref. Fig. 201).

(3) Use 1/2-inch wrench on manual override hex to open valve.

(4) When position indicating and manual lock lever is in fully OPEN (O) position, insert manual vent plug through manual open hole and into lock lever, and tighten.

R (5) Flight crew will perform normal engine start sequence
R (Ref. 71-00-00).

WARNING: WEAR PROTECTIVE GLOVES WHEN WORKING ON BLEED AIR SYSTEM WITH ENGINE RUNNING.

R (6) When engine start sequence is completed and engine is
R running, remove manual vent plug from open locking
R position and continue with Step 3B.

CR B. Deactivation - Mechanical

C NOTE: Required only if isolation valve will not close with
C flight station control switch.

R NOTE: If engine isolation valve can be controlled (open/closed)
R from Engine Bleed Control Panel it is not necessary to
R perform Step 3.

(1) Use 7/16-inch wrench to remove manual vent plug from vent port (Ref. Fig. 201).

(2) Use 1/2-inch wrench on manual override hex to close
R valve (Ref. Fig. 201).

(3) When position indicating and manual lock lever is in fully CLOSED (S) position, insert manual vent plug through manual closed hole and into lock lever, and tighten.

R (4) Close and secure access panel opened in Step 3A(1).

R (5) On Flight Engineer/Second Officers (FE/SO) ENGINE BLEED CONTROL panel, zone 215, placard applicable ENG ISLN VALVE switchlight ISOLATION VALVE INOPERATIVE.

(6) Make appropriate entry in aircraft log book.

CR C. Deactivation - Mechanical, Borescope Check Lockout.

C (1) Open appropriate access panel (Ref. Fig. 201).

C (2) Use 7/16 inch wrench to remove manual vent plug from
C vent port (Ref. Fig. 201).

C (3) Use 1/2-inch wrench on manual override hex to close
CR valve (Ref. Fig. 201).

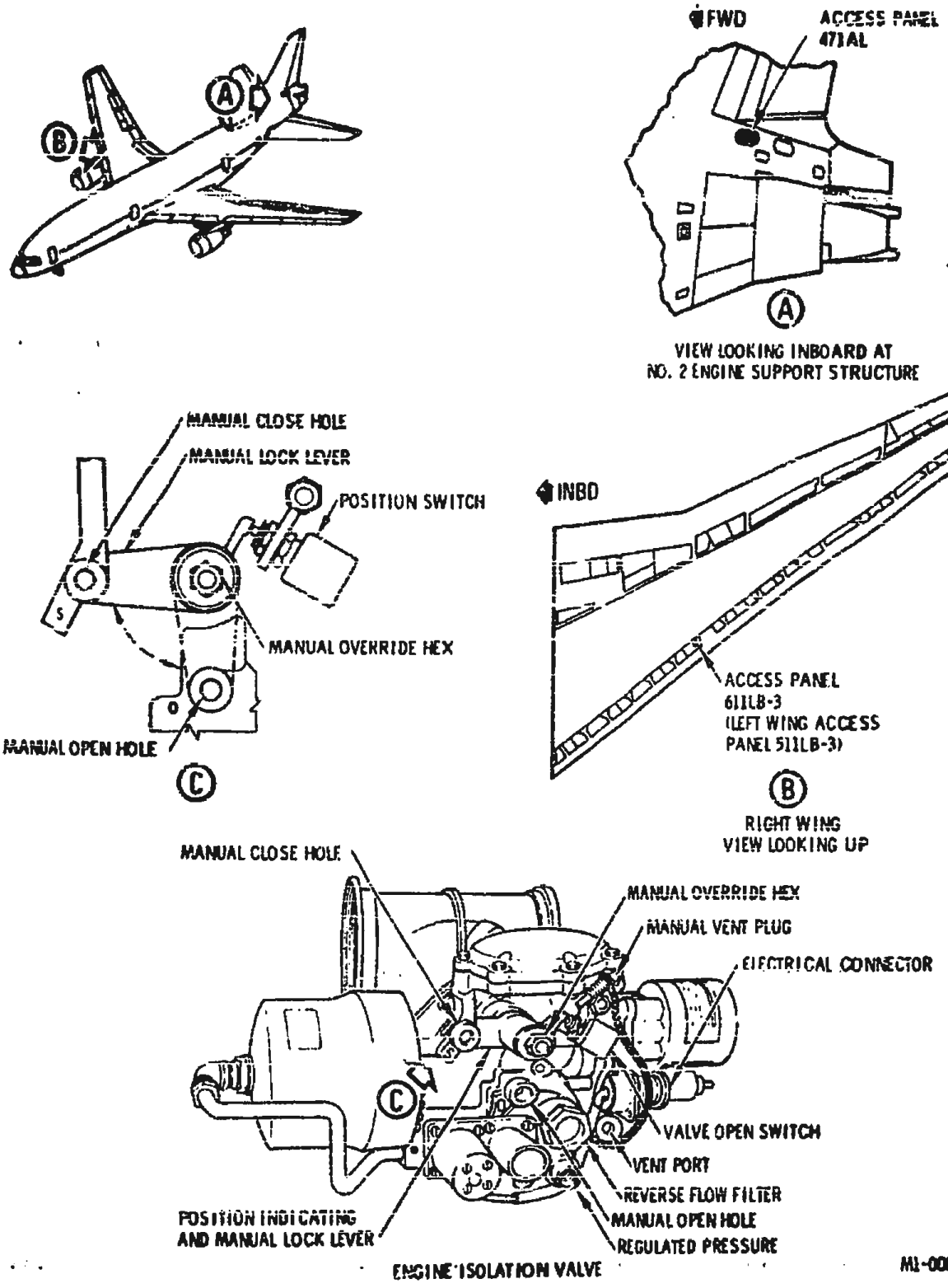
C (4) When position indicating and manual lock lever is in
C the fully CLOSED (S) position, insert manual vent plug
C through manual closed hole and into lock lever, and
C tighten.

C (5) On Flight Engineer/Second Officers ENGINE BLEED CONTROL
C panel, zone 215, tag applicable ENG ISLN VALVE
C switchlight ISOLATION VALVE "LOCKED OUT".

C (6) After work is complete unlock isolation valve by,
C removing manual vent plug from closed (s) position and
C installing in vent port.

C (7) Close appropriate access panel.

C (8) Remove tag from Flight Engineer's ENG ISOLATION VALVE
C switchlight.



R
R

Engine Isolation Valve
Figure 201

EFFECTIVITY: ALL

001B

ENGINE ISOLATION VALVE - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for No. 1, No. 2, and No. 3 engine isolation valves and respective air filters except for circuit breaker and access panel references.

2. Equipment and Material

Isolation Valve

Protective Plugs and Caps

R Filter replacement

Normal Flow Filter - Hamilton Standard P/N 727604-4

Normal Flow Preformed Packing - Hamilton Standard P/N 69494J910

Reverse Flow Filter - Hamilton Standard P/N 727604-4

Reverse Flow Preformed Packing - Hamilton Standard P/N 69494J910

Lockwire - Fed Spec QQ/W-390, 0.020-inch diameter or equivalent

Dry Film lubricant - Dow Corning No. 44A or equivalent - Dow Corning Corp Midland, Mich. 48641

Elbow Filter (aircraft 001-031)

Elbow Filter, Hamilton Standard PN 750674-1

R Preformed Packing, Hamilton Standard PN 69494J906

3. Referenced Procedures

20-36-02	Double T-bolt V-band Coupling - Removal and Installation
36-11-18	Engine Isolation Valve - Adjustment and Test

4. Removal/Installation - Engine Isolation Valve

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following breaker as applicable:

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 1 (G10),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 2 (G11),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 3 (G12).

(2) Open wing access panel 511LB for engine No. 1 valve or 611LB for engine No. 3 valve (Ref. Fig. 401). Remove center engine support structure access panel 471AL for engine No. 2 valve (Ref. Fig. 402).

(3) Disconnect electrical connector.

(4) Release nut securing remote sensor hose to adapter.

(5) Remove adapter and seal from remote downstream sensing port connection and retain for use when installing another isolation valve.

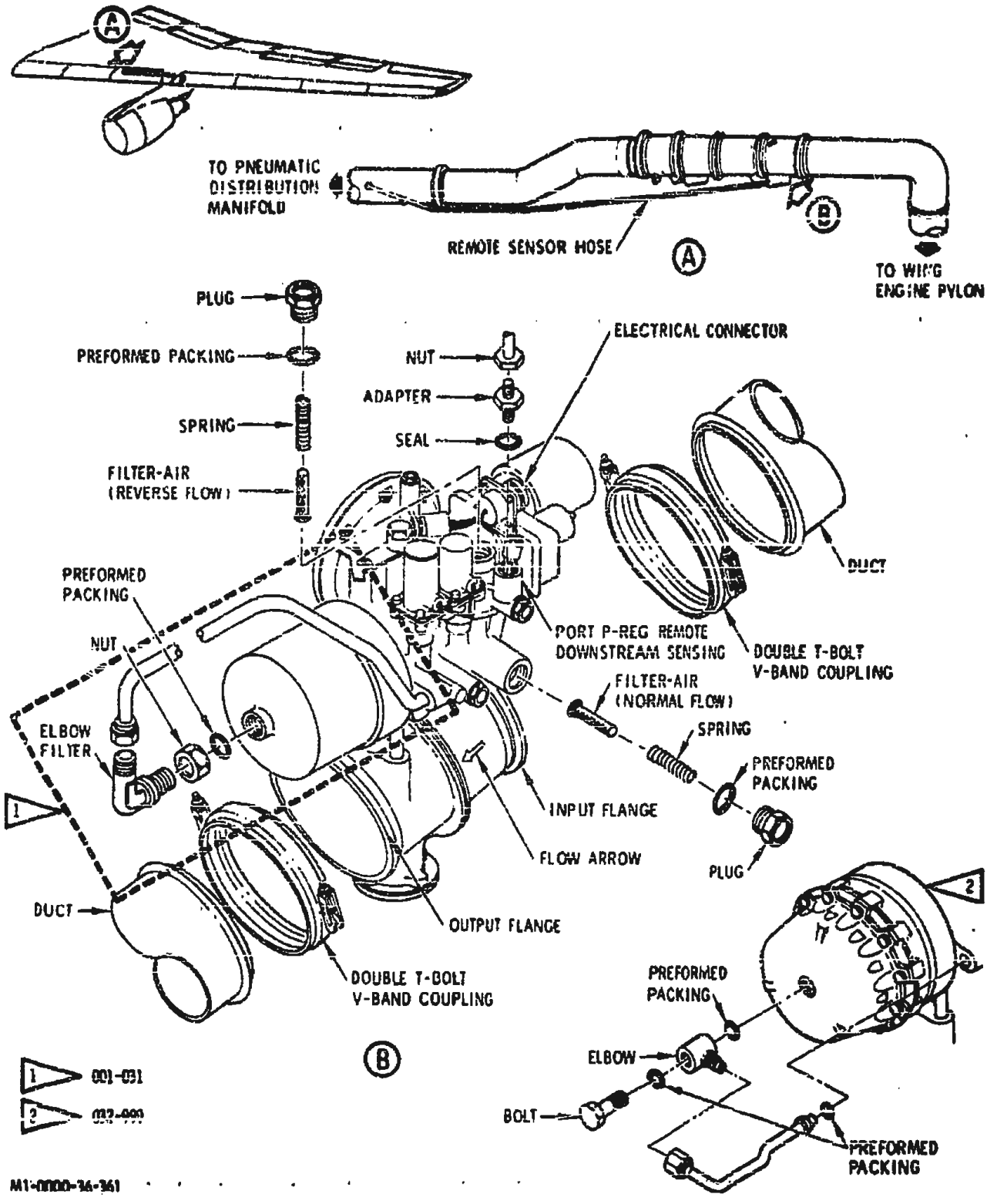
(6) Remove double T-bolt V-band couplings (Ref. 20-36-02) securing inlet and outlet flanges to duct.

(7) Remove engine isolation valve.

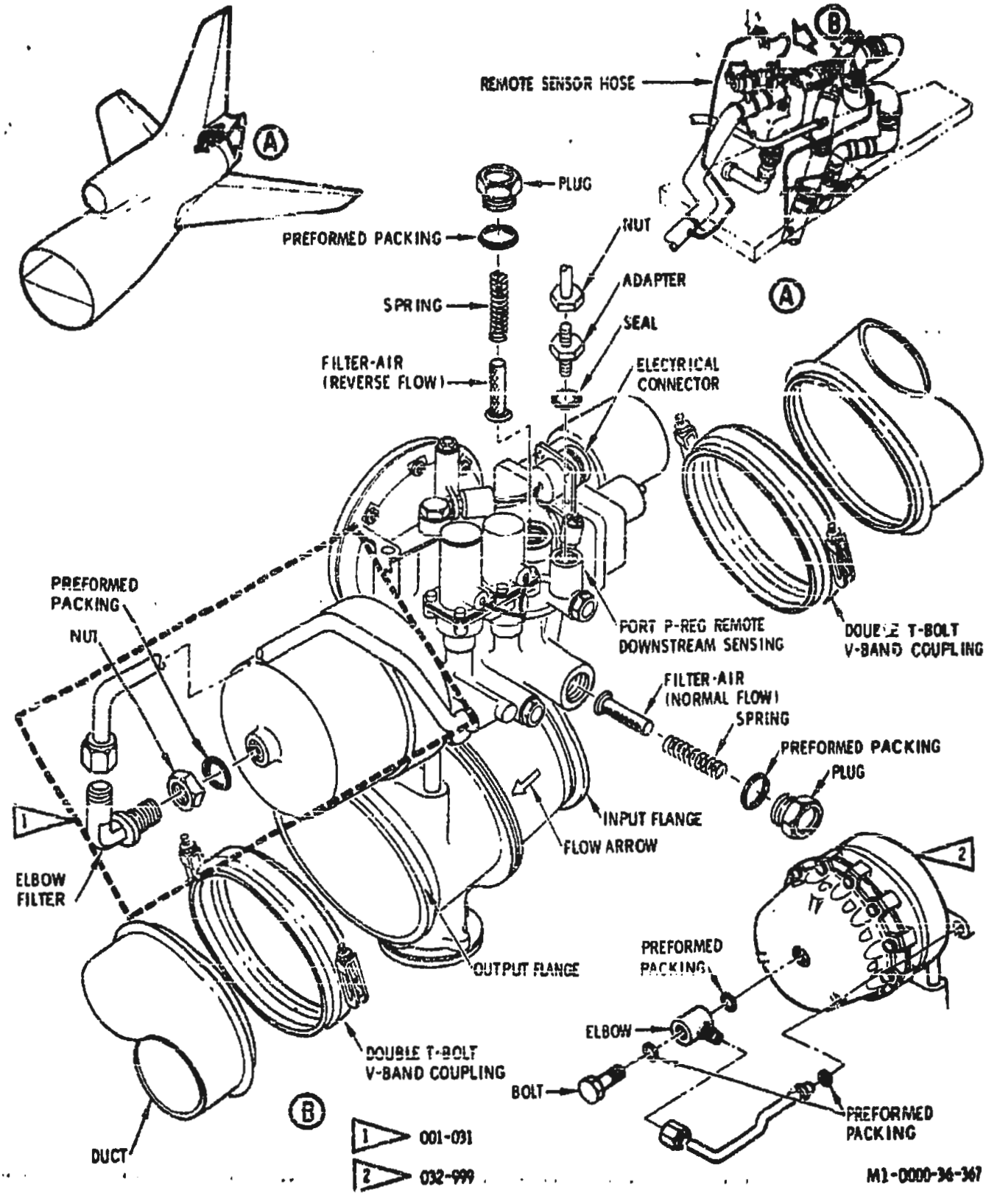
(8) Install protective covers over ducts.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.



Wing Engine Isolation Valve - Removal and Installation
Figure 401



Engine No. 2 Isolation Valve - Removal and Installation
Figure 402

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(3) Align valve to duct with flow arrow pointing inboard, for engine No. 1 or No. 3 valve, or forward for engine No. 2 valve. Mate Indexing slot on valve flange with key on duct flange and secure inlet and outlet flanges with double T-bolt V-band couplings (Ref. 20-36-02).

(4) Install and tighten electrical connector.

(5) Inspect seal for damage, replace if necessary. Install seal in remote downstream sensing port connection.

(6) Install adapter in port connection.

(7) Connect remote sensor hose to adapter and secure with nut.

(8) Install access panel removed in Step 4A(2).

(9) Remove tag and close circuit breaker opened in Step 4A(1).

(10) Remove placards installed in Paragraph 4.

(11) Perform bleed air isolation valve adjustment and test procedures (Ref. 36-11-18) on valve that was replaced.

5. Removal/Installation - Air Filters

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following circuit breaker as applicable:

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 1 (G10),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 2 (G11),

ENGINE BLEED CONROL - ENG ISLN VALVE - ENG 3 (G12).

(2) Open wing access panel 511LB-3 for engine No. 1 valve or 611LB-3 for engine No. 3 valve (Ref. Fig. 401). Remove center engine support structure access panel 471AL for engine No. 2 valve (Ref. Fig. 402).

(3) Cut lockwire and remove plug from the normal flow filter housing. Separate preformed packing from plug. Discard preformed packing.

(4) Remove spring and filter from housing.

(5) Cut lockwire and remove plug from reverse flow filter housing. Separate preformed packing from plug and discard preformed packing.

(6) Remove spring and filter from housing.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

CAUTION: FILTERS MUST BE INSTALLED FLANGED END FIRST.

(1) Coat preformed packing with lubricant (Dow Corning No. 44 or equivalent) and install packing on plug.

(2) Install filter (flanged end first) in normal flow filter housing, followed by spring and plug with preformed packing. Tighten plug to 45 to 50 pound-inch above running torque and lockwire with 0.020 inch diameter lockwire.

(3) Coat preformed packing with lubricant (Dow Corning No. 44 or equivalent) and install packing on plug.

(4) Install filter (flanged end first) in reverse flow filter housing, followed by spring and plug with preformed packing. Tighten plug to 45-50 pound-inch above running torque and lockwire with 0.020 inch diameter lockwire.

(5) Install access panel removed in Step 5A(2)

(6) Remove tag and close circuit breakers opened in Step 5A(1)

(7) Remove placards installed in Paragraph 5A.

6. On aircraft 001-031,
Removal/Installation - Valve Elbow Filter

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following circuit breaker as applicable:

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 1 (G10),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 2 (G11),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 3 (G12).

(2) Open wing access panel 511LB-3 for engine No. 1 valve or 611LB-3 for engine No. 3 valve (Ref. Fig. 401). Remove center engine support structure access panel 471AL for engine No. 2 valve (Ref. Fig. 402).

(3) Loosen nut on tube from elbow filter and separate tube from elbow filter.

NOTE: If tube is pulled from valve actuator housing, discard preformed packing on the tube and install a new preformed packing, Hamilton Standard PN 694943110 on the tube before installing tube into actuator housing.

(4) Remove elbow filter from actuator housing cover and separate preformed packing (Ref. Fig. 401) and nut from elbow filter. Discard preformed packing.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/CO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Coat preformed packing with lubricant (Dow corning No. 4 or equivalent) and install nut and packing on elbow filter. Do not lubricate threads.

(2) Install elbow filter on actuator cover (Ref. Fig. 401) and tighten nut to 20-25 lb-in. above running torque.

(3) Install tube coupling sleeve to elbow filter and tighten.

(4) Install access panel removed in Step 6A(2).

(5) Remove tag and close circuit breakers opened in Step 6A(1).

R (6) Remove placards installed in Paragraph 6A.

ENGINE ISOLATION VALVE - ADJUSTMENT AND TEST

1. General

Field adjustment of the engine isolation valve is not recommended. Test procedures are the same for the No. 1, No. 2, and No. 3 engine isolation valves, except for circuit breakers and access panels.

2. Equipment and Materials

Valve Tester, Hamilton Standard GS9400-7, or equivalent

R Test Plug, Hamilton Standard GS14099-1 or GS13841-1, or
R equivalent

R Test Plug, Hamilton Standard GS14123-1 or GS14111-1 (2 required), or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

24-00-00	Electrical Power System - Maintenance Practices
36-11-00	Pneumatic Power - Maintenance Practices
78-30-00	Thrust Reverser - Description and Operation
71-00-00	Power Plant - Adjustment and Test

4. Adjustment/Test

A. Operational Test

(1) Preparation

(a) Turn on electrical power (Ref. 24-00-00).

(b) On pilots overhead circuit breaker panel, CB1, zone 210, verify that the following applicable circuit breakers are closed:

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 1 (G10),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 2 (G11),

ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 3 (G12),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 2 (G14),

ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 3 (G15),

ENGINE BLEED CONTROL - FUS ISLN VALVE (G16),

ENGINE BLEED CONTROL - CROSS BLEED VALVES - L (G17),

ENGINE BLEED CONTROL - CROSS BLEED VALVES - R (G18),

ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL - 1 (H3),

ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL - 2 (H4),

ENVIR CONTROL SYSTEM - PACK - FLOW CONTROL 3 (H5),

ENVIR CONTROL SYSTEM - PACK - HI FLOW CONT (H6).

(c) On Flight Engineer/Second Officers (FE/SO) aft circuit breaker panel CB3, zone 215, verify that circuit breaker ECS - IND LT (G12) is closed.

(2) Test

(a) Apply pneumatic power from any source except the engine where valve is under test (Ref. 36-11-00).

(b) On FE/SO ENGINE BLEED CONTROL panel depress ENG ISLN VALVE switchlight. Verify flowbar remains off.

(c) Start applicable engine and run at idle speed (Ref. 71-00-00).

(d) On flight engineer/second officer ENGINE BLEED CONTROL panel, zone 215, depress the following applicable switchlights and verify that the flowbar legends come on:

HI PRESS (NO. 1, 2, or 3)

ENG ISLN VALVE (NO. 1, 2, or 3)

CROSSBLEED (Left & Right)

ISLN VALVE (Aft Fuselage)

PACK FLOW CONTROL (NO. 1, 2 or 3)

(e) On FE/SO ENGINE BLEED CONTROL panel, verify that applicable pressure indicator displays approximately 35 psig.

(f) Increase engine power setting. Verify that pressure indicator displays approximately 35 psig.

(g) Increase engine power setting until applicable HI PRESS flowbar goes off. Verify that pressure indicator displays approximately 38 psig.

(h) Increase engine power setting. Verify that pressure indicator does not exceed 50 psig.

(i) Check applicable ENG ISLN VALVE switchlight. Verify that ENG ISLN VALVE flowbar is on.

(j) Return circuit breakers and switchlights to pretest positions.

(k) Turn off electrical power (Ref. 24-00-00).

B. Functional Test

WARNING: TAG FLIGHT ENGINEERS/SECOND OFFICERS BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF TEST.

RECENT OPERATION OF PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Open access panel 511LB for engine No. 1 valve, 611LB for engine No. 3 valve, or 471AL for engine No. 2 valve.

(2) Set up valve tester near applicable engine isolation valve.

(3) Remove ground test plugs G1, G2, and G3 (Ref. Fig. 501).

R (4) Install test plug GS14099-1 or GS13841-1 in port G1.

R (5) Install test plugs GS14123-1 or GS14111-1 in ports G2 and G3.

(6) Turn on electrical power (Ref. 24-00-00).

(7) On pilots circuit breaker panel, CB1, zone 210, verify that the applicable circuit breaker is closed:

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1 (G10),

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1 (G11),

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 3 (G12).

On FE/SO aft circuit breaker panel CB3, zone 215, verify that circuit breaker ECS-IND LT (G12) is closed.

(8) On FE/SO ENGINE BLEED CONTROL panel, zone 215, depress applicable switchlight ENG ISLN VALVE (No. 1, 2, or 3) and verify that OFF legend is off and flow bar is off.

(9) Apply pressure of 12 psig to port G1. Verify valve opens and flowbar comes on.

(10) Apply vacuum of 11.0 to 13.0 psia to port G3. Apply pressure of 34 psig to port G2. Verify that flowbar goes off and valve closes.

(11) Decrease pressure on port G2 to 28 psig. Increase pressure at port G1 to 50 psig. Verify that valve opens and flowbar comes on.

(12) Increase pressure at port G2 to 30 psig. Verify valve remains open and flowbar remains on.

(13) Increase pressure at port G2 to 50 psig. Verify that valve closes rapidly and flowbar goes off. Remove vacuum from port G3.

(14) Reduce pressure at ports G1 and G2 to 12 psig and apply 12 psig to port G3. Verify valve remains closed and flowbar stays off.

(15) On pilots rear lower center console, zone 210, lift hinged footrest cover.

(16) Lift and hold applicable switch APU/GND AIR TO REVERSERS 1, 2, or 3 (Ref. 36-11-00). Verify that ENG ISLN VALVE flow bar comes on.

(17) While still holding APU/GND AIR TO REVERSERS switch on, release ENG ISLN VALVE switchlight. Verify that OFF legend comes on and flowbar goes off.

(18) Release APU/GND AIR TO REVERSERS switch and reinstall cover.

(19) Remove pressure from all ports.

(20) Remove test plugs from ports G1, G2, and G3.

(21) Reinstall ground test plugs with preformed packings.

(22) Torque plugs at ports G1 and G3 90 to 100 lb in. Torque plug at port G2 20 to 25 lb in. Secure plugs with lock-wire.

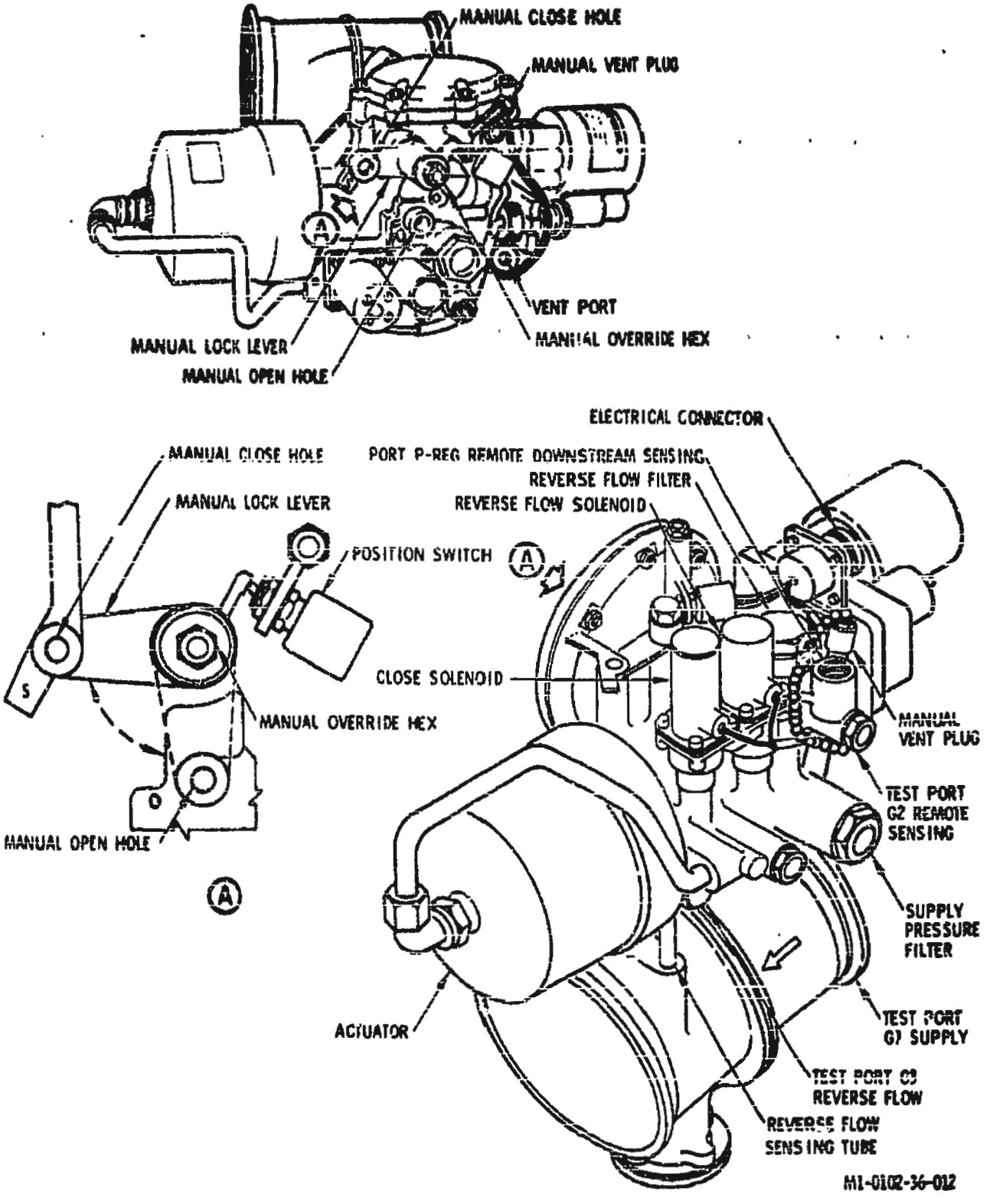
(23) Remove valve tester.

(24) Return circuit breakers and switchlights to pretest positions.

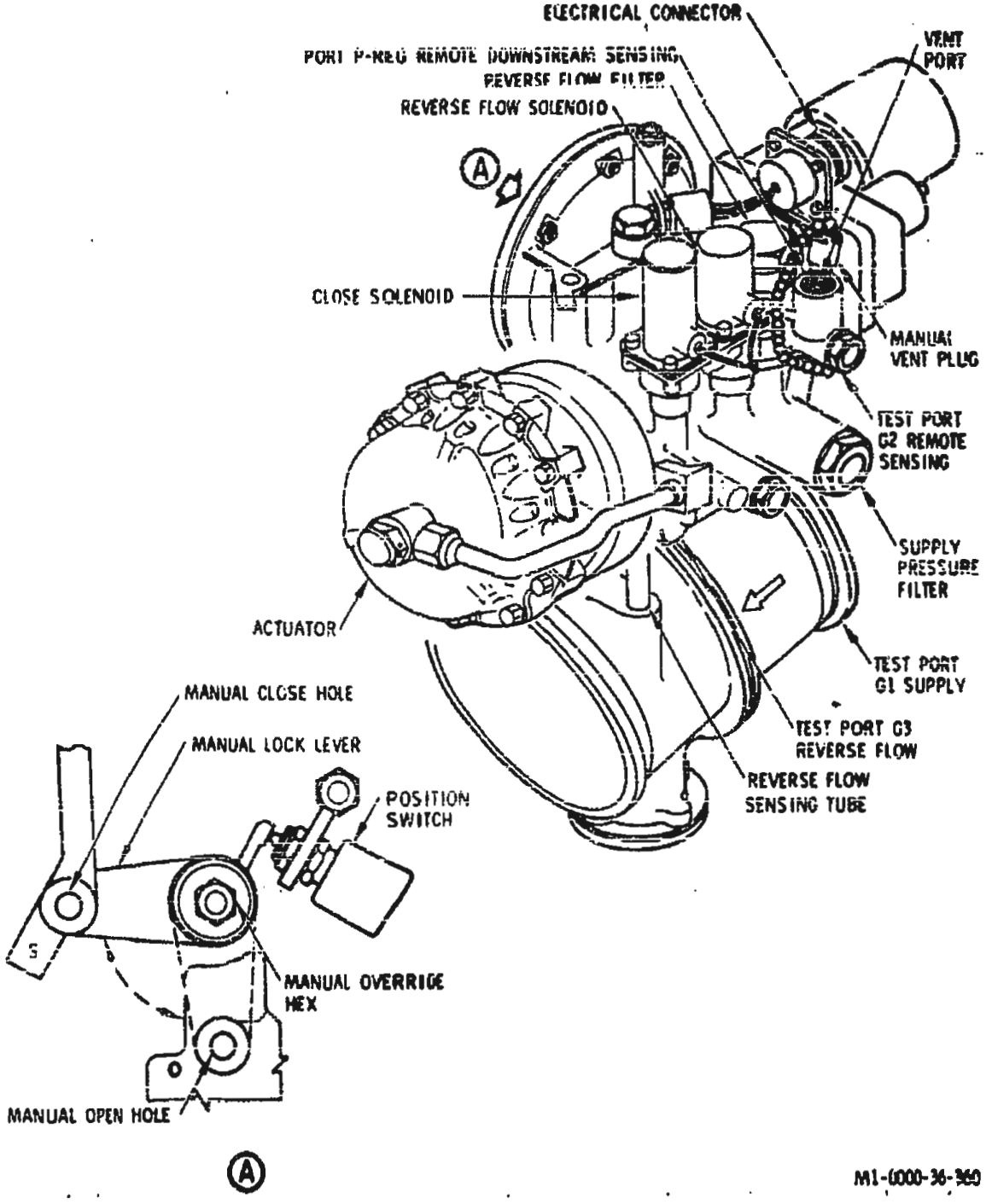
(25) Turn off electrical power (Ref. 24-00-00).

(26) Reinstall access panels.

(27) Remove tags installed at beginning of Paragraph 4B.



R Engine Isolation Valve - Adjustment and Test
R Figure 501



R Engine Isolation Valve - Adjustment and Test
R Figure 501

R EFFECTIVITY: 032-999
R
001B

ENGINE ISOLATION VALVE INSPECTION AND CHECK

1. General

Units with obvious or unreparable damage should be removed and sent to overhaul.

2. Referenced Procedures

36-11-18 Engine Isolation Valve - Cleaning and Painting

3. Inspection/Check

A. Inspection

(1) Inspect electrical connector for broken pins or other damage.

(2) Inspect inlet and outlet flanges for nicks, dents, or other damage.

(3) Loosen filter nuts and remove filter seals. Discard seals.

(4) Inspect filters for clogged or dirty pores.

(5) If required, clean dirty or clogged filters (Ref. 36-11-18, Cleaning and Painting).

(6) Install new seals on filters.

(7) Install filters and secure with nuts.

ENGINE ISOLATION VALVE CLEANING AND PAINTING

1. Equipment and Materials

   Soft-bristle brush

   Petroleum Solvent, Spec AMS3160B, or equivalent

   Lint-free cloth

2. Referenced Procedure

   36-11-18 Engine Isolation Valve - Inspection and Check

3. Cleaning/Painting

   A. Cleaning

      WARNING: USE PETROLEUM SOLVENTS ONLY IN A WELL-VENTILATED AREA AND WITH PROPER PRECAUTIONS TO PREVENT FIRE. WEAR GOGGLES WHEN USING COMPRESSED AIR TO DRY PARTS.

      CAUTION: USE COMPRESSED AIR CAREFULLY ON FINE-MESH FILTER SCREEN TO PREVENT DAMAGE.

      (1) Clean dirty or clogged filters (Ref. 36-11-18, Inspection and Check) with solvent. Use a soft-bristle brush or immerse and agitate filters in solvent.

      (2) Clean all exterior surfaces of valve with a lint-free cloth dampened in solvent.

      (3) Dry unit with dry, filtered, compressed air.

BLEED AIR OVERPRESSURE RELIEF VALVE REMOVAL AND INSTALLATION

1. General

The engine No. 1 and 3 bleed air overpressure relief valves are installed inboard of the engine overpressure shutoff valves in the wings leading edge, zones 510 and 610 respectively, (Ref. Fig. 401). The engine No. 2 bleed air overpressure relief valve is installed in the engine support structure forward of the engine overpressure shutoff valve, zone 471. It is located on the left side of the duct and vents overboard through a tube assembly to the left side of the support structure (Ref. Fig. 402).

C NOTE: Plastic cap on outlet has been deleted from valve outlet.

2. Equipment and Materials

Engine No. 1 or 3: Protective cover

Engine No. 2: Protective plug

Anti-seizing Lubricant MIL-A-907 (FELPRO C5A is an approved equivalent) FELPRO CORP. 7450 N. McCormick Blvd., Skokie, Ill. 60076

3. Removal/Installation

A. Removal

(1) Tag Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) Open wing access door 511LB for engine No. 1 valve or 611LB for engine No. 3 valve. Remove power plant access panel 471AR for engine No. 2 valve.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROULY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

R C C (3) Engine No. 2 only:
Disconnect hose assembly from relief valve (Ref. Fig. 402).

CR (4) Unscrew relief valve from fitting and union.

CR (5) Remove relief valve.

R (6) Install protective cover for engine No. 1 or 3 valve, or protective plug for engine No. 2 valve on duct opening.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Remove protective cover for engine No. 1 or 3 valve or protective plug for engine No. 2 valve from duct.

C C (3) Place seal over duct port for engine No. 1 or 3 (Ref. Fig. 401).

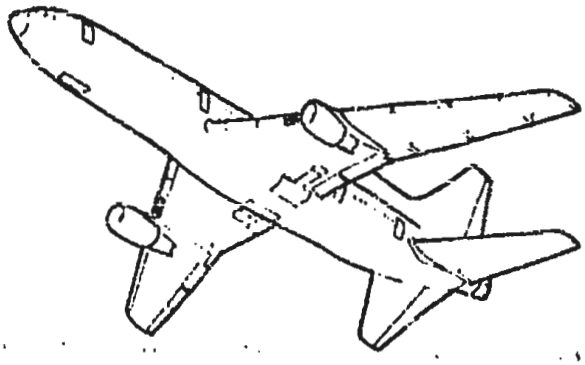
C (4) Apply anti-seizing lubricant to valve and screw relief valve into duct or union for No. 2 engine and tighten.

R C (5) Engine No. 2 only:
Connect hose assembly to relief valve and tighten nut.

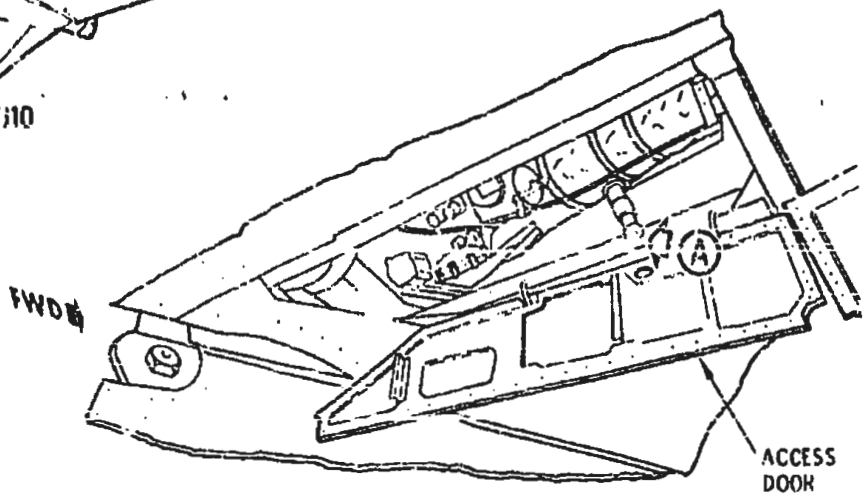
R (6) Close wing access door for engine No. 1 or 3, or install access panel 471BL for engine No. 2.

R (7) Remove tags installed at Step 3A(1).

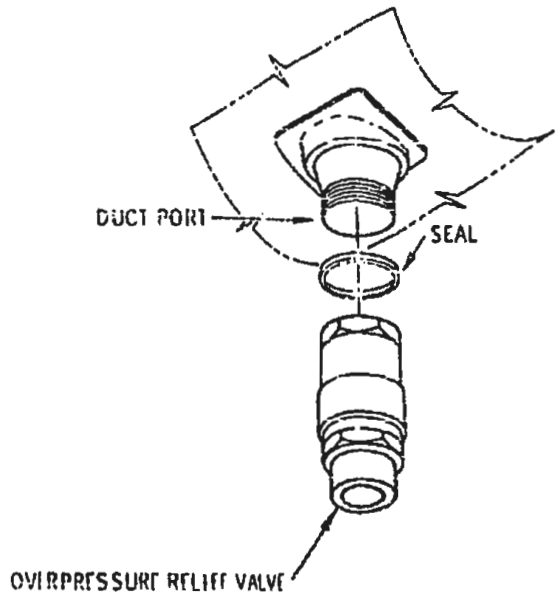
R (8) Perform bleed air overpressure relief valve check on valve that was replaced.



ZONES 510 AND 610



LOOKING UP AT LEADING
EDGE INBOARD OF PYLON



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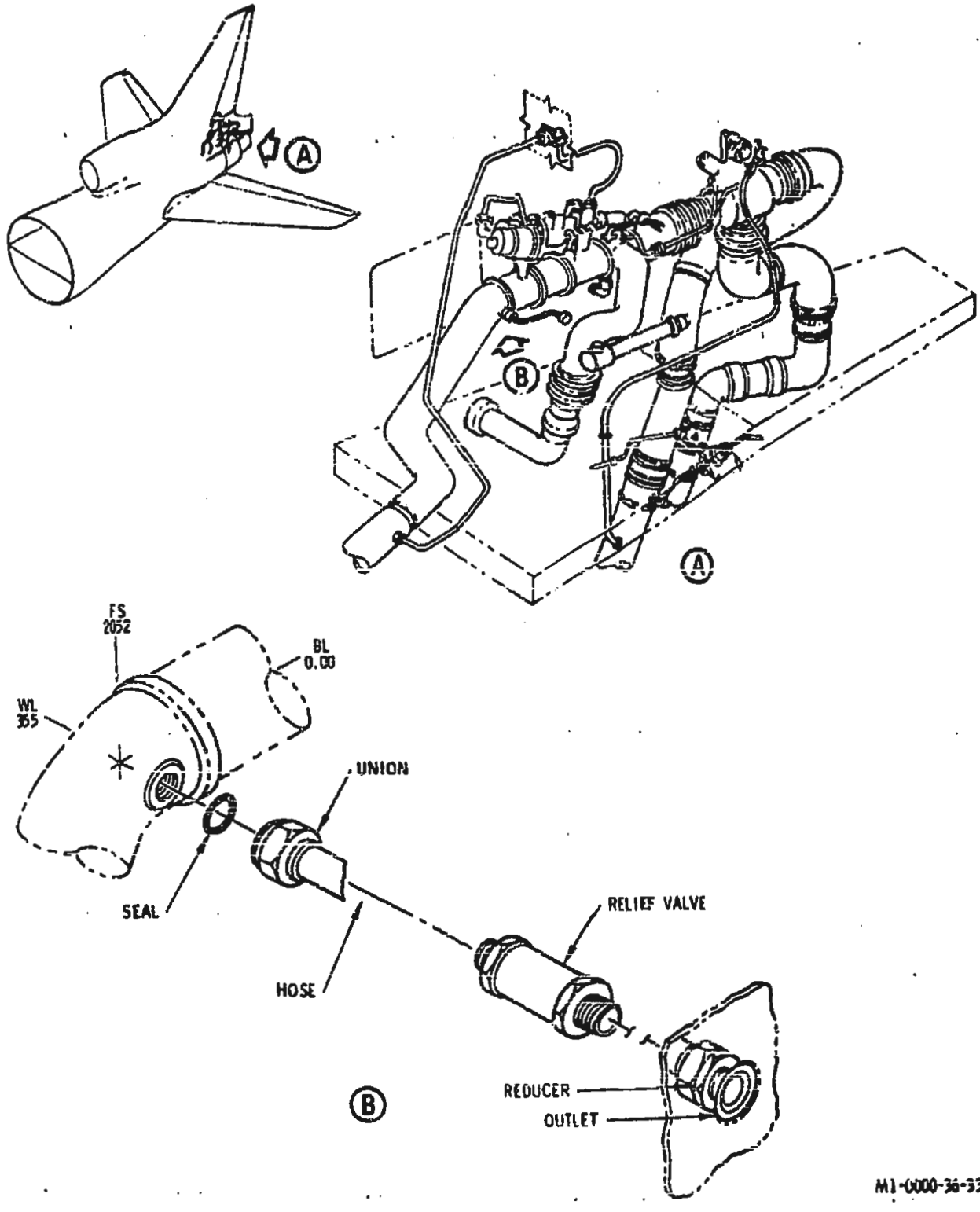
CR Wing Engine Overpressure Relief Valve
CR Removal and Installation
CR Figure 401



CR Engine No. 2 Overpressure Relief Valve - Removal and Installation
CR Figure 402

EFFECTIVITY: ALL

001B

BLEED AIR OVERPRESSURE RELIEF VALVE - INSPECTION AND CHECK

1. General

One bleed air overpressure relief valve is used in each of the three engine bleed air systems and is installed in the duct immediately downstream of the system overpressure shutoff valve (Ref. 36-00-00). The function of the relief valve is to limit distribution manifold system air pressure to a maximum of 135 to 145 psig.

Air pressure in any part of the distribution manifold system can increase to relief pressure only under the following conditions:

Isolation of an engine bleed air system and its portion of the distribution manifold system (Ref. 36-14-00). Isolation is accomplished through closure of pertinent distribution system isolation valves and of control valves to systems using pneumatic pressure.

Malfunction of one or more engine high pressure bleed air control components, resulting in failure of that engine high pressure bleed valve at other than the fully closed position.

With the above conditions, the overpressure relief valve in that system would open as necessary to protect ducting between that engine system overpressure shutoff valve and the closed isolation valves and using system control valves.

2. Referenced Procedures

R	6-40-00	Exterior Access Doors and Panels
	36-00-00	Pneumatic System - Description and Operation
	36-11-00	Engine Bleed Air System Fault Isolation
	36-11-22	Bleed Air Overpressure Relief Valve - Removal and Installation
	36-13-00	High Pressure Ground Air System - Maintenance Practices
	49-00-00	Airborne Auxiliary Power System - Maintenance Practices

3. Inspection/Check

CR A. Inspection (Deleted)

B. Check

(1) Use high pressure ground air source (Ref. 36-13-00) or operate APU (Ref. 49-00-00) to pressurize distribution manifold to normal operating pressure (Ref. 36-00-00).

(2) At relief valve discharge port, check for overpressure relief valve leakage.

(3) If leakage is detected, reject and replace relief valve (Ref. 36-11-22).

(4) If no leakage from relief valve is detected a malfunction in that engine bleed air system is indicated. Perform engine bleed air system fault isolation procedure (Ref. 36-11-00).

C. Functional Check

(1) A functional check of the bleed air overpressure relief valve must be performed in the shop.

WING ENGINE STARTER DUCT COMPENSATOR - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures for the No. 1 and No. 3 engine starter duct compensators are the same except for access panel references.

2. Referenced Procedure

	20-36-02	Double T-bolt V-band Coupling - Removal and Installation
R	71-00-01	Wing-mounted QEC Unit - Maintenance Practices

3. Removal/Installation

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Remove pylon access panel 452CT for engine No. 1 duct or 462CT for engine No. 3 duct (Ref. Fig. 401).

(2) Remove double T-bolt V-band couplings (Ref. 20-36-02).

(3) Remove compensator from duct.

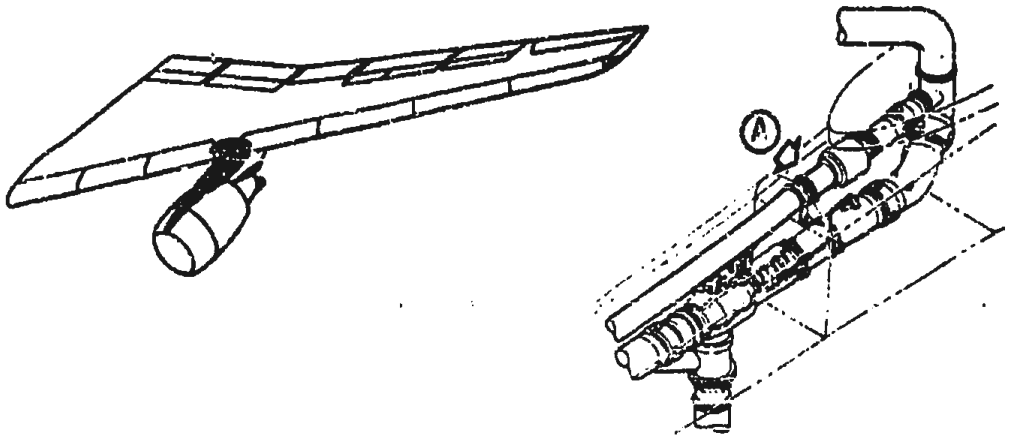
(4) Install protective covers on ducts.

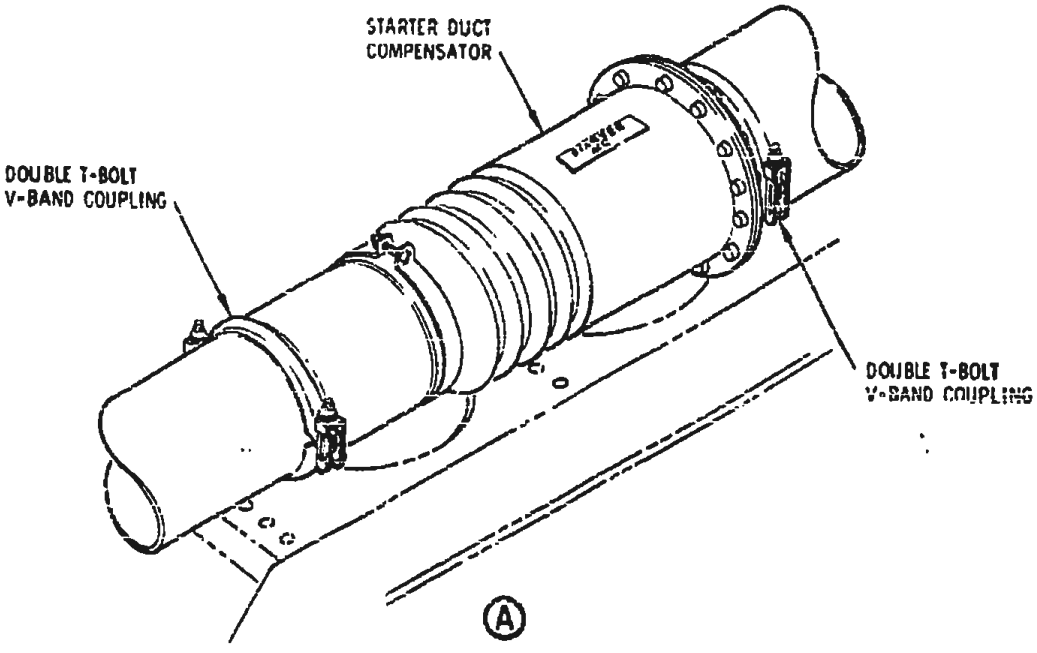
B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE

(1) Remove protective covers from duct and inspect duct flanges for cleanliness and condition.

(2) Hold compensator in position for installation.





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Wing Engine Starter Duct Compensator - Removal and Installation
Figure 401

(3) Install double T-bolt V-band couplings (Ref. 20-36-02) to secure compensator.

R (4) Perform duct leak check (Ref. 71-00-01).

R (5) Install access panel removed in Step 3A(1).

R (5) Remove placard installed at beginning of Paragraph 3A.

WING ENGINE HIGH-PRESSURE BLEED AIR DUCT SEAL REMOVAL AND INSTALLATION

1. General

The high-pressure duct seal comes in 2 parts. The larger section is installed above the hoop plate and the smaller section is below. Removal and installation procedures are the same for both the number 1 and number 3 engine high-pressure duct seal except for the access panel references. Location of the high-pressure duct seal is at zones 410 and 430.

2. Equipment and Material

Splitter Area Access Work Platform

3. Referenced Procedures

R	6-50-00	Interior Access Doors and Removable Panels
	36-00-00	Pneumatic System - Maintenance Practices
	36-11-51	Wing Engine High-Pressure Duct - Removal and Installation
	78-30-00	Thrust Reverser Servicing

4. Removal/Installation

A. Removal

(1) Tag the following to prevent operation until completion of procedures:

(a) Flight Engineer/Second Officer (FE/SO) bleed air and APU panels.

(b) Center console - engine throttles.

(c) Pilots overhead panel - engine start switches.

(d) Base of center console - APU/GND air thrust reverser hold switches.

(e) Three external high-pressure ground air connections.

(2) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - HI PRESS VALVES - ENG. 1 (G13), or ENG. 3 (G15), as applicable.

(3) Install thrust reverser deactivator pip-pin (Ref. 78-30-00).

(4) Install splitter area access work platform in engine cold stream collector nozzle (Ref. Fig. 401).

(5) Remove splitter access panels 418AL, 418AR, 418BL and 418BR for engine No. 1 or 438AL, 438AR, 438BL and 438BR for engine No. 3 (Ref. 6-50-00).

R

NOTE: Working from both sides will facilitate removal.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(6) Remove high-pressure duct (Ref. 36-11-51).

(7) Remove mounting screws holding high-pressure duct seal in place (Ref. Fig. 402).

(8) Remove both parts of high-pressure duct seal.

B. Installation

(1) Verify that placards listed in Step 4A(1) are installed.

(2) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

(3) Install and screw HP duct seal in place with larger section of seal on top of the hoop plate and small section on bottom.

(4) Install items removed in Step 4A(6).

(5) Pressurize distribution manifold system (Ref. 36-00-00).

(6) On base of pilots center console, lift APU/GND AIR THRUST REVERSER HOLD SWITCH.

(7) Check for leakage around pneumatic ducts.

(8) Release APU/GND AIR THRUST REVERSER HOLD SWITCH.

(9) Depressurize distribution manifold system.

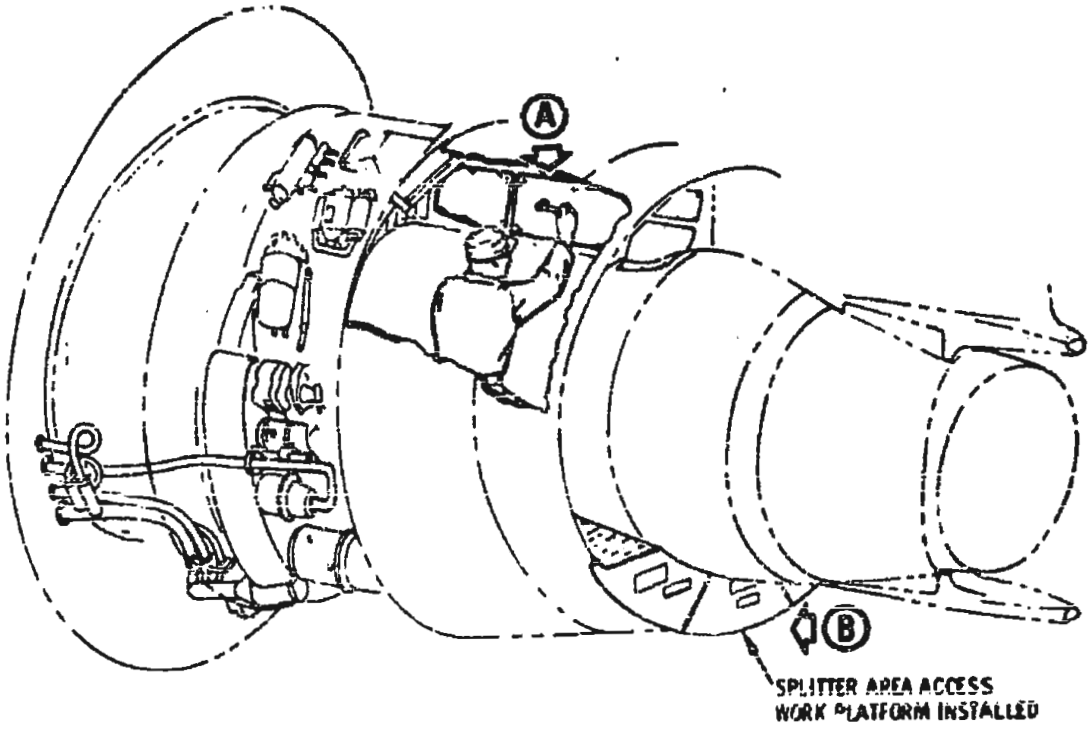
(10) Install splitter access panels.

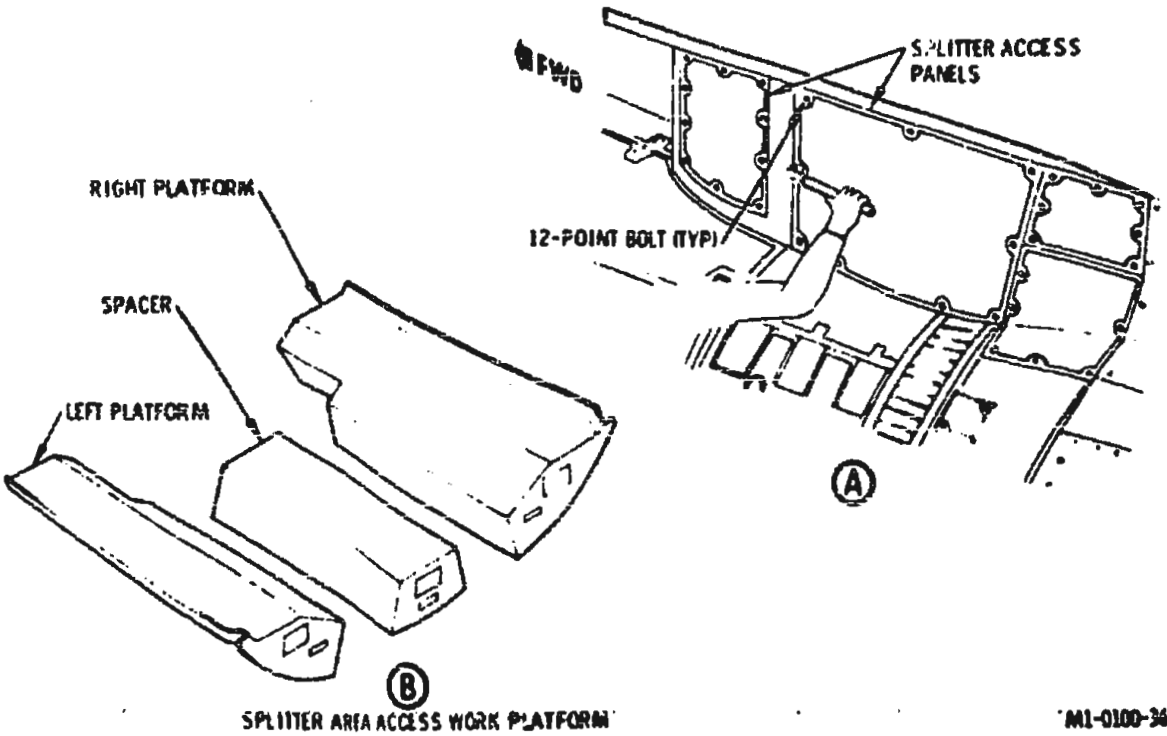
(11) Remove splitter area access work platform.

R R (12) Remove thrust reverser deactivator pip-pin (Ref. 78-30-00).

R R (13) Remove tag and close the circuit breaker opened in Step 4A(2).

R (14) Remove placards installed in Step 4A(1).





R R Splitter Area Access Work Platform - Removal and Installation
Figure 401

R R EFFECTIVITY: ALL

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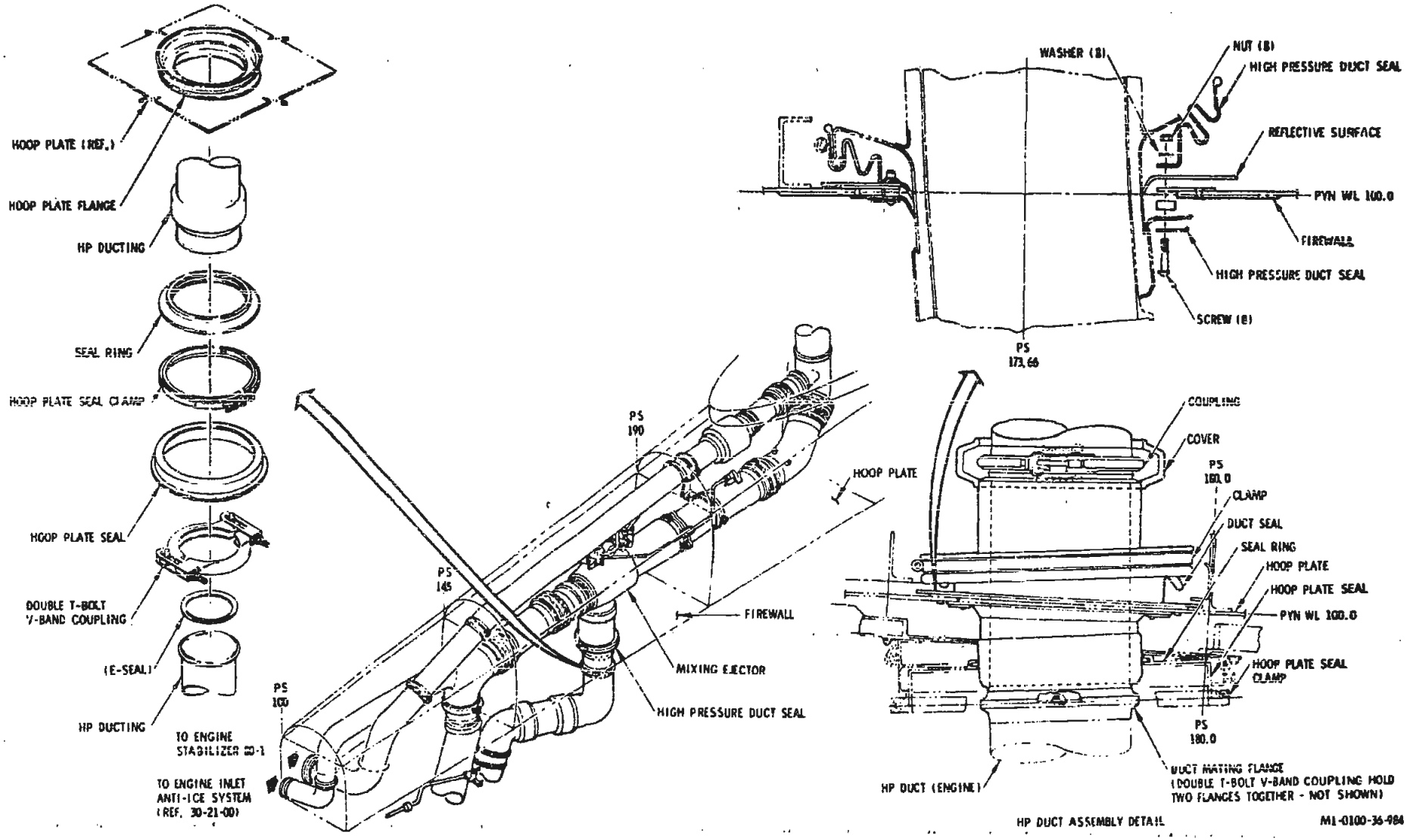


R Wing Engine High-Pressure Bleed Air Duct Seal - Removal and
R Installation
R Figure 402

R EFFECTIVITY: ALL
R
0018

R FUSELAGE-MOUNTED ENGINE (NO. 2) HIGH-PRESSURE BLEED AIR DUCT SEAL
R REMOVAL AND INSTALLATION

R 1. General

R The location of the fuselage-mounted engine (No. 2)
R high-pressure bleed air duct seal is at zone 471, station 2130.

R 2. Referenced Procedure

R 71-00-03 Fuselage-Mounted QEC Unit (Engine No. 2) - Removal
R and Installation

R 3. Removal/Installation

R A. Removal

R (1) Remove fuselage-mounted engine No. 2 (Ref. 71-00-03).

R (2) The high-pressure duct is the aft bleed air duct (Fig.
R 401).

R (3) Remove 2 high-pressure duct support rods.

R (4) Remove 2 duct pressure seal mounting clamps.

R (5) Work duct seal off end of duct.

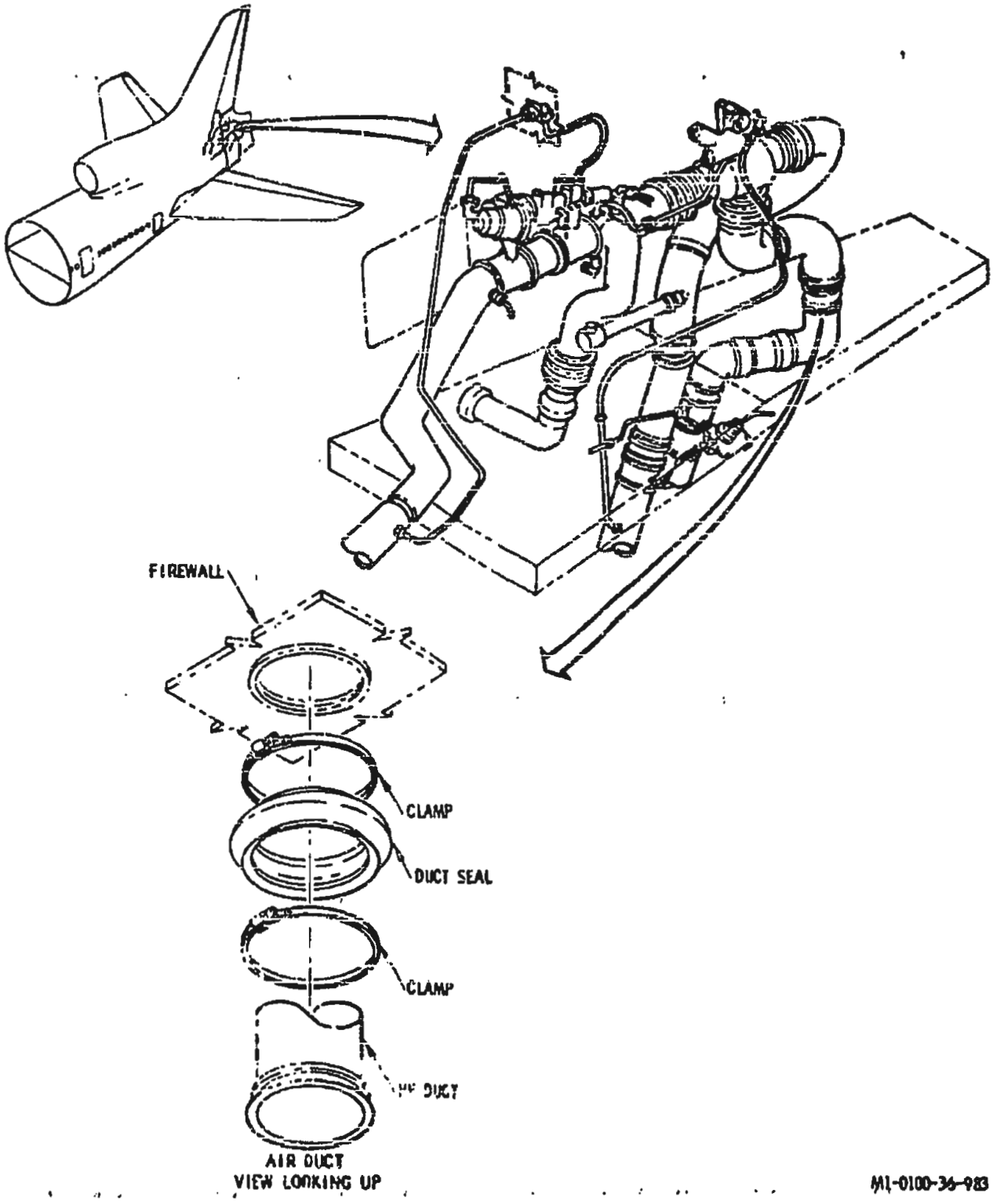
R B. Installation

R (1) Work duct seal on over the end of the high-pressure
R duct.

R (2) Install 2 duct pressure seal mounting clamps.

R (3) Install 2 high-pressure duct support rods.

R (4) Install fuselage-mounted engine No. 2.



R Fuselage-Mounted Engine No. 2 High-Pressure Bleed Air Duct Seal
R Removal and Installation
R Figure 401.

R EFFECTIVITY: ALL
R
001A

INTERMEDIATE-PRESSURE ANTI-ICE CHECK VALVE REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the No. 1 and No. 3 engine intermediate-pressure anti-ice check valves, except for access panel references.

2. Referenced Procedures

20-36-02 Double T-bolt V-band Coupling - Removal and Installation

36-11-47 Wing Engine Starter Duct - Removal and Installation

3. Removal/Installation

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES. RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

R A. Removal (on Engine No. 1 and 3)

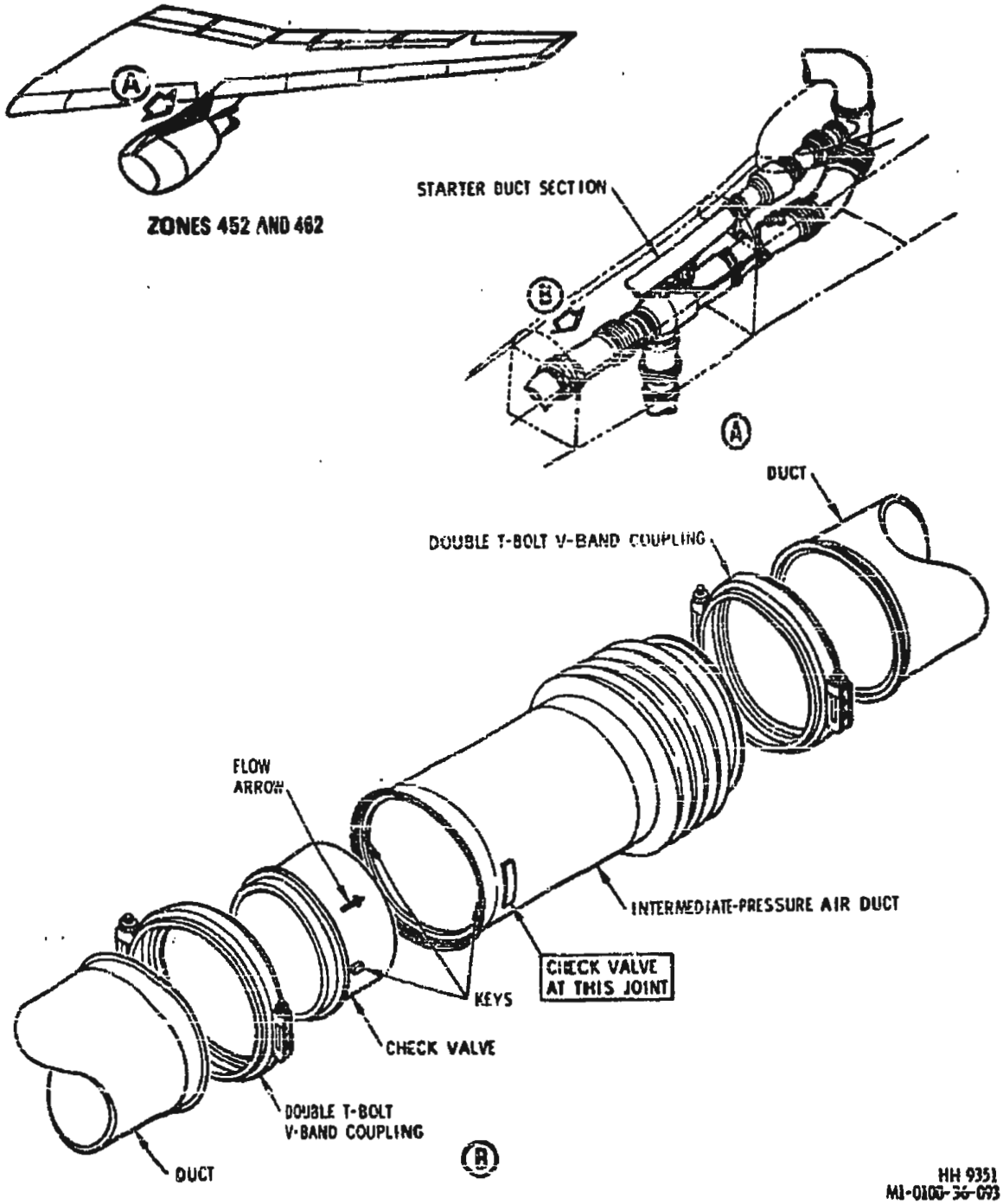
(1) Remove pylon access panels 452AT, 452BT, and 452CT for engine No. 1 or 462AT, 462BT, and 462CT for engine No. 3.

(2) Remove starter duct section (Ref. 36-11-47).

(3) Remove double T-bolt V-band couplings (Ref. 20-36-02) securing each end of intermediate-pressure air duct and remove duct.

(4) Remove the intermediate-pressure anti-ice check valve from duct (Ref. Fig. 401).

(5) Install protective covers on ducts.



R Intermediate-pressure Anti-ice Check Valve
R Removal and Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL

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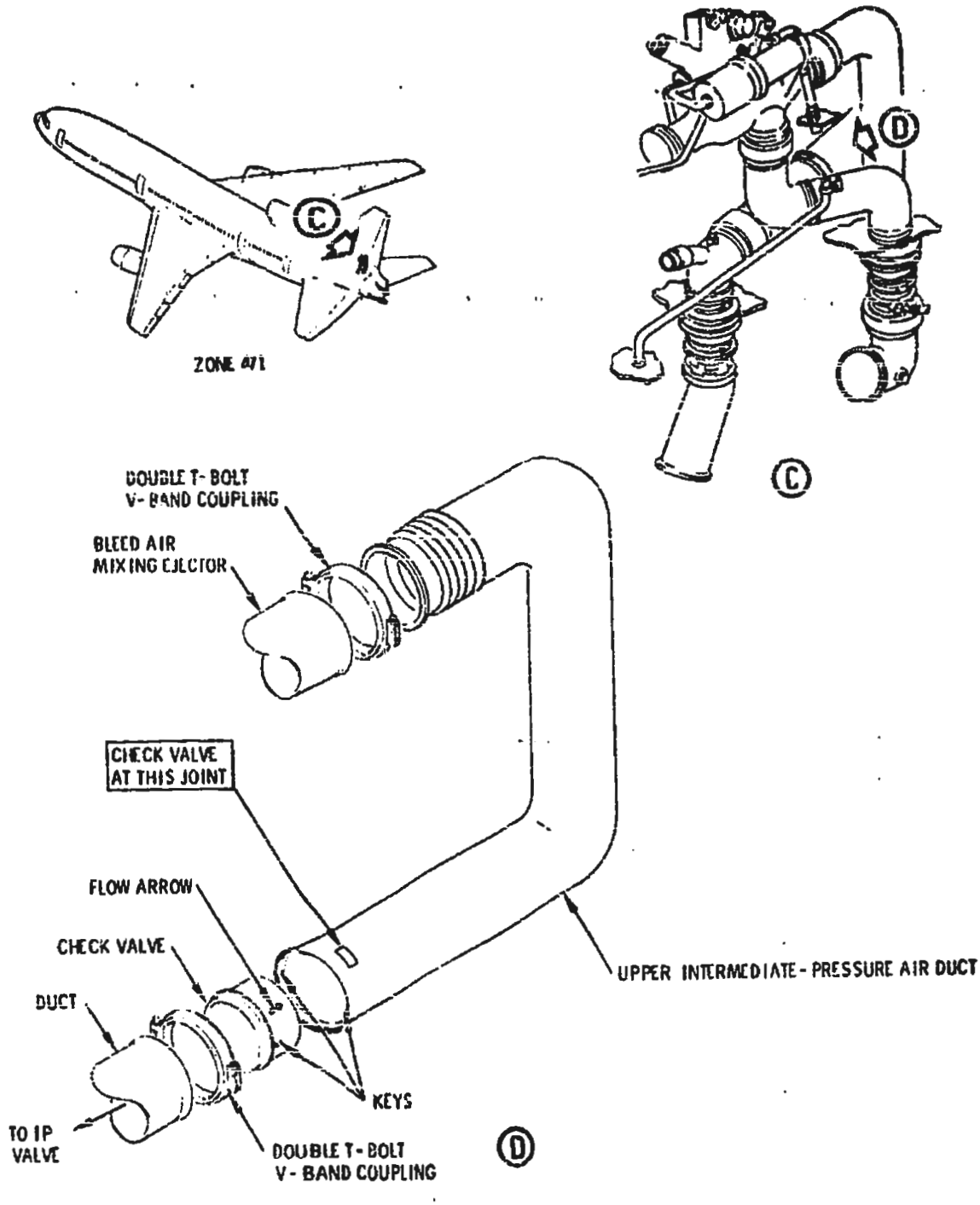

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R Intermediate-pressure Anti-ice Check Valve
R Removal and Installation
R Figure 401 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

R B. Installation (on Engine No. 1 and 3)

(1) Remove protective covers from ducts.

(2) Deflect duct flex joint down zero to 2 degree (Ref. Fig. 401).

(3) Line up check valve keys with key slots in duct flange.

(4) Insert check valve into duct with arrow pointing toward duct.

(5) Twist check valve in either direction to secure it in the duct.

(6) Install duct and secure with double T-bolt V-band couplings (Ref. 20-36-02).

(7) Install starter duct section (Ref. 36-11-47).

(8) Install pylon access panels removed in Step 3A(1).

(9) Remove placard installed at beginning of Paragraph 3.

R C. Removal (on Engine No. 2)

R (1) Remove center engine support structure access panels
R 471DL and 471CR.

R (2) Remove double T-bolt V-band couplings (Ref. 20-36-02)
R securing each end of the upper intermediate-pressure
R air duct. Remove duct.

R (3) Rotate and remove intermediate-pressure anti-ice check
R valve from duct (Ref. Fig. 401).

R (4) Install protective covers on all open ducts.

R D. Installation (on Engine No. 2)

R (1) Remove protective covers from ducts.

R (2) Line up check valve keys with key slots in duct flange.

R (3) Insert check valve into duct with arrow pointing toward
R duct.

R (4) Rotate check valve in either direction to secure it in
R the duct.

R (5) Install duct and secure with double T-bolt V-band
R couplings (Ref. 20-36-02).

R (6) Install center engine support structure access panels
R 471DL and 471CR.

R (7) Remove placards installed at the beginning of Paragraph
R 3.

OVERPRESSURE SHUTOFF VALVE - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the No. 1, No. 2, and No. 3 engine overpressure shutoff valves, except for circuit breaker and access panel references. The wing engine (No. 1 and No. 3) overpressure shutoff valves are installed in the wing leading edge inboard of the engine pylon, zones 510 and 610 (Ref. Fig. 401). The center engine (No. 2) overpressure shutoff valve is installed in the engine support structure aft of the aft canted bulkhead, zone 471, (Ref. Fig. 402).

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

Air Filter

3. Referenced Procedures

20-00-06	Safetying Practices
20-36-01	Single T-bolt V-band Coupling - Removal and Installation
20-36-02	Double T-bolt V-band Coupling - Removal and Installation

4. Removal/Installation - Valve

A. Removal

R WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following circuit breaker as necessary:

R ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1
R (G10),

R ENGINE BLEED CONTROL - ENG ISLN VALVE - ENG 2
R (G11),

R ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 3
R (G12).

(2) Open wing access panel 511LB for engine No. 1 valve or 611LB for engine No. 3 valve. Remove center engine support structure access panel 471AR for engine No. 2 valve.

(3) Disconnect electrical cable from valve electrical connector.

(4) Remove safety wire from coupling cover and slide cover inboard over duct (Ref. 20-00-06).

(5) Remove single T-bolt V-band coupling (Ref. 20-36-01) securing outlet flange to duct.

(6) Remove double T-bolt V-band coupling (Ref. 20-36-02) securing inlet flange to duct.

(7) Remove overpressure shutoff valve.

(8) Install protective covers over ducts.

B. Installation

R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO
R BLEED AIR AND APU CONTROL PANELS AND THE THREE
R HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

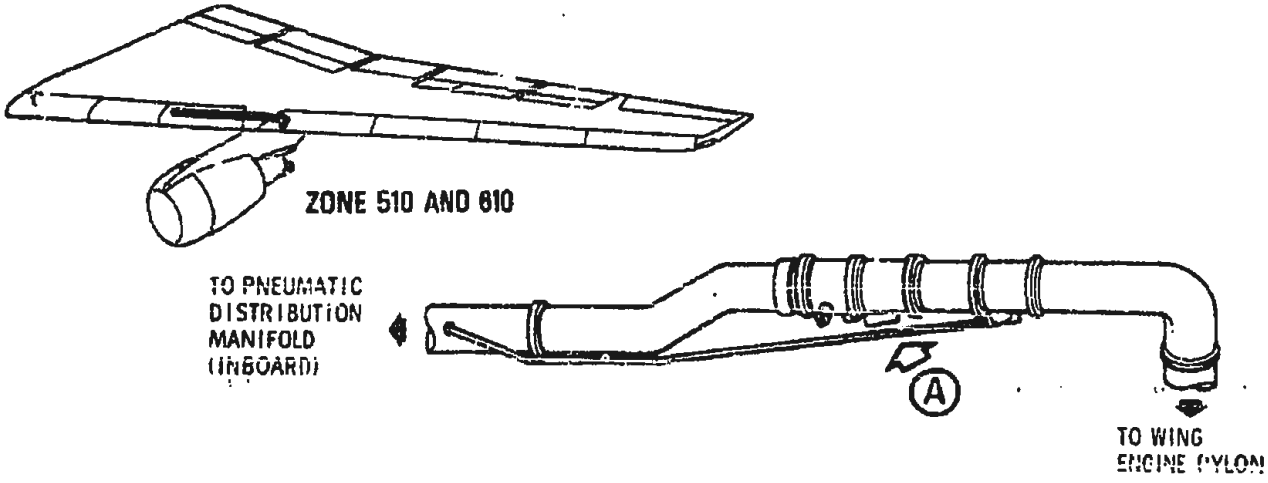
(1) Verify circuit breaker opened in Step 4A(1) is open and tagged.

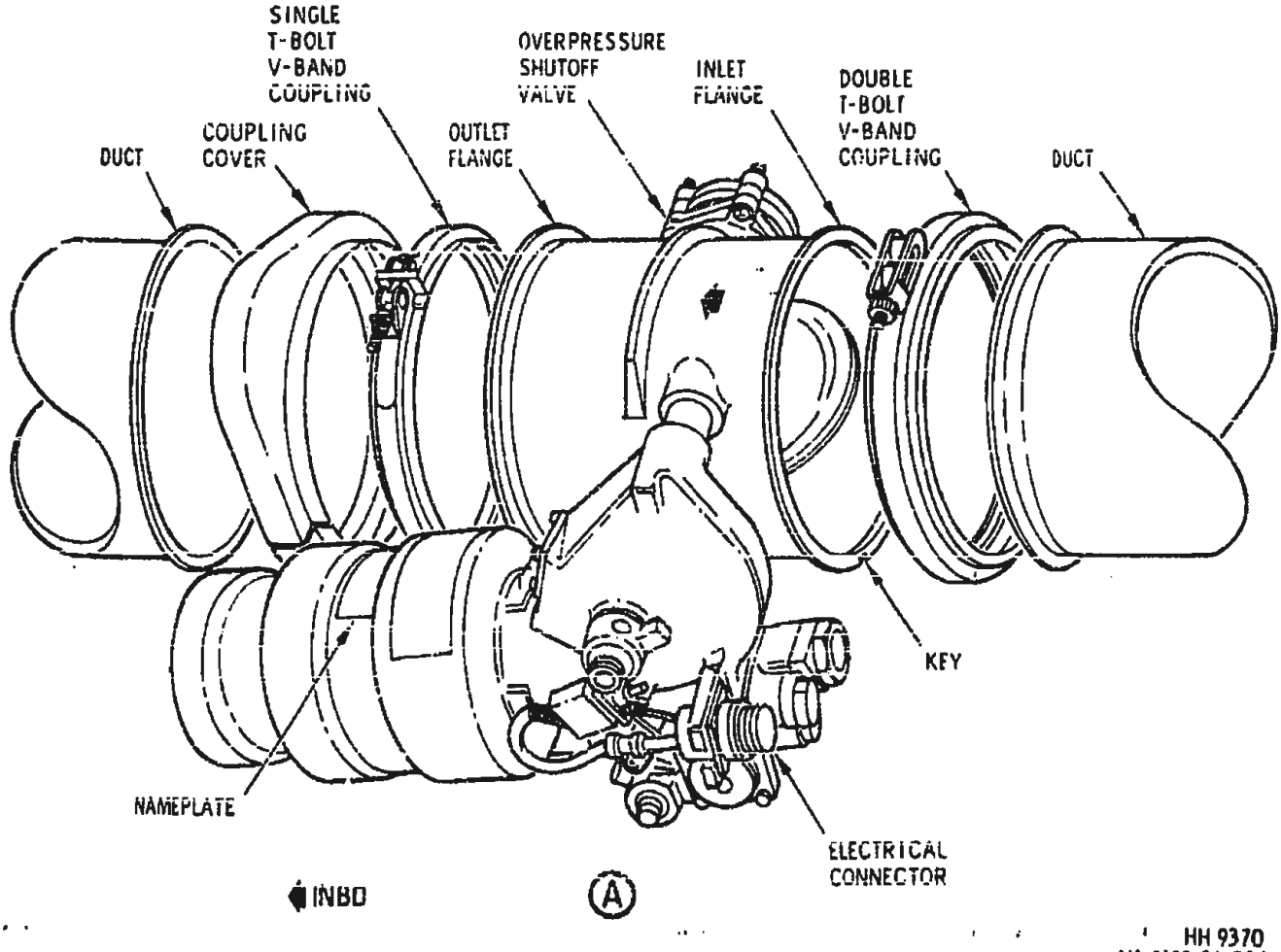
(2) Remove protective covers from ducts and inspect duct flanges for cleanliness and condition.

(3) Align valve inlet flange and duct keys with valve flow arrow pointing inboard, on wing engine valves or forward on center engine valve, and secure with double T-bolt V-band coupling (Ref. 20-36-02).

(4) Align and secure outlet flange to duct with single T-bolt V-band coupling (Ref. 20-36-01).

(5) Install and secure coupling cover with safety wire (Ref. 20-00-06).





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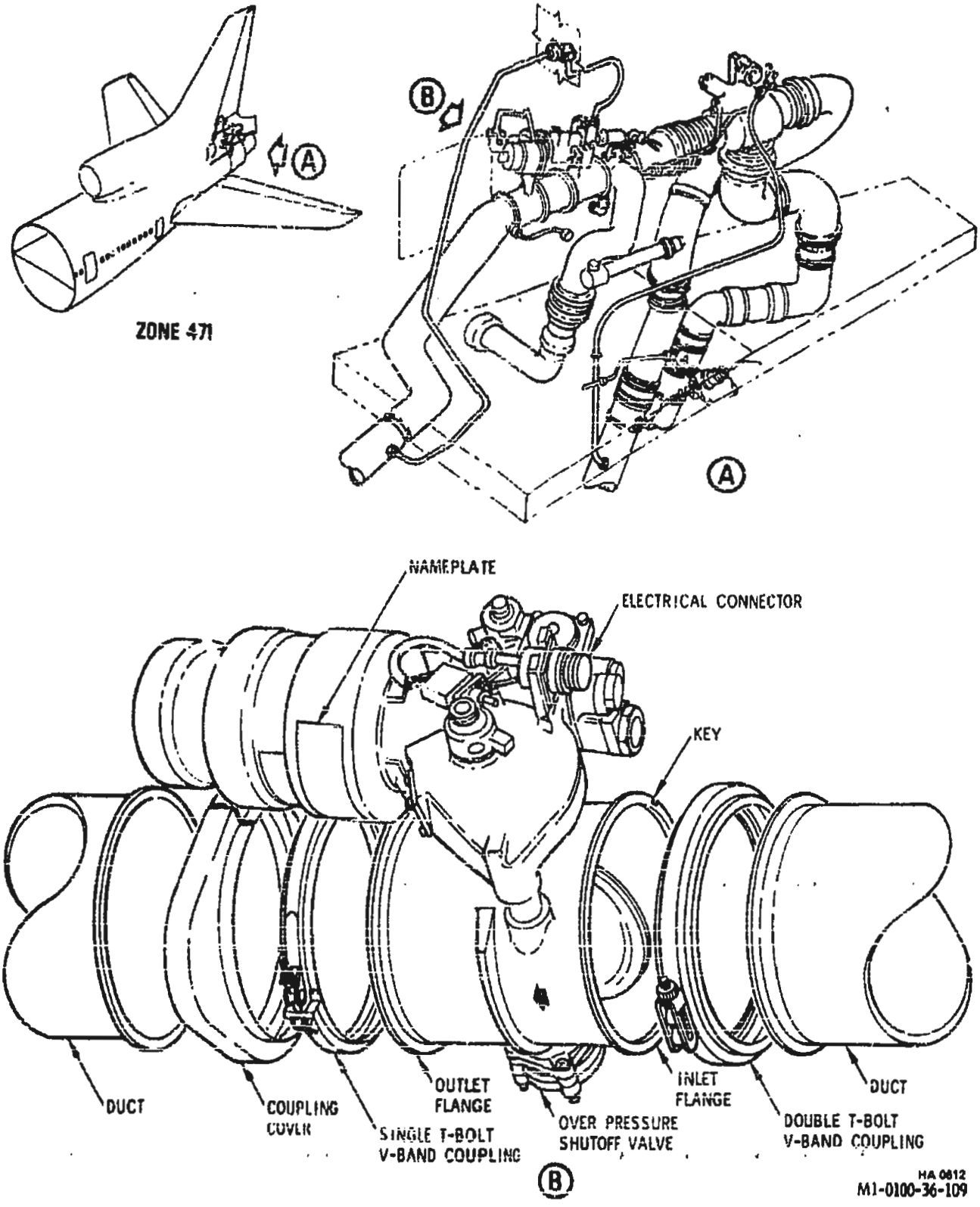
Wing Engine Overpressure Shutoff Valve - Removal and Installation
Figure 401



R Center Engine Overpressure Shutoff Valve - Removal and Installation
R Figure 402

(6) Install electrical connector to valve, and lock-wire connector.

(7) Install access panel removed in Step 4A(2).

(8) Remove tag and close circuit breaker opened in Step 4A(1).

(9) Remove placard installed in Paragraph 4.

5. Removal/Installation - Valve Air Filter

A. Removal

R WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following circuit breaker as necessary:

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1 (G10)

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 2 (G11)

ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 3 (G12)

(2) Open wing access panel 511LB for Engine NO. 1 valve or 611LB for engine NO. 3 valve. Remove center engine support structure access panel 471AR for engine NO. 2 valve.

(3) Remove screw thread plug, preformed packing, helical spring and air filter (Ref. Fig. 403).

(4) Inspect preformed packing on plug and replace if damaged.

(5) Inspect helical compression spring and replace if damaged.

B. Installation

R R R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE

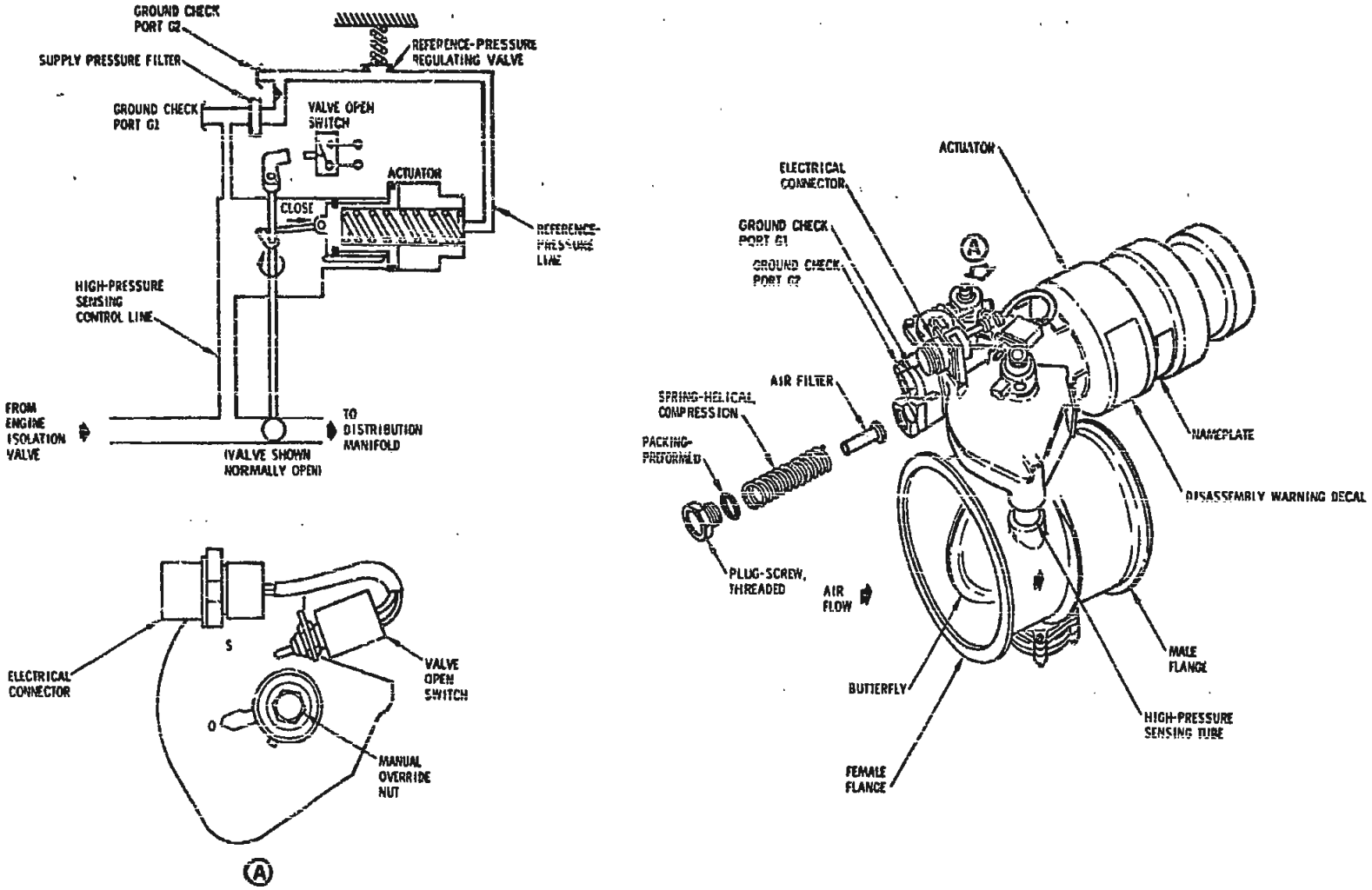
CAUTION: FILTER MUST BE INSTALLED FLANGED END FIRST (REF. FIG. 403).

(1) Install filter (flanged end first) followed by spring, preformed packing and plug (Ref. Fig. 403).

(2) Tighten plug to a torque of 45-50 inch-pounds and lockwire.

(3) Close/reinstall access panel opened in Step 5A(2).

(4) Remove warning placards installed in Paragraph 5.



R Overpressure Shutoff Valve Air Filter - Removal/Installation
R Figure 403

OVERPRESSURE SHUTOFF VALVE - ADJUSTMENT AND TEST

1. General

The three overpressure shutoff valves, one in each of the engine bleed air systems, are identical. The valves are not adjustable on the aircraft. Functional test procedures are the same for all valves except for circuit breaker and access panel references. If a valve position switch is suspected of malfunction it may be replaced.

2. Equipment and Materials

Valve Tester, GS9400-7, Hamilton Standard, or equivalent

Test Plug, GS13958-1, Hamilton Standard, or equivalent

Test Plug, GS14123-1, or GS14111-1 Hamilton Standard, or equivalent

Hose Assembly, AD30008-1, Hamilton Standard, or equivalent (2 required)

Hose Assembly, AD30008-2, Hamilton Standard, or equivalent

Shutoff Valve, AD30786-1, Hamilton Standard, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

3. Referenced Procedures

24-00-00	External Power - Maintenance Practices
36-00-00	Pneumatic System - Maintenance Practices
49-00-00	Auxiliary Power Unit - Maintenance Practices

4. Adjustment/Test

A. Functional Test

R (1) Open wing access panel 511LB for engine No. 1 valve,
R 611LB for engine No. 3 valve, or remove center engine
R support structure right side panel 471AR for engine No. 2 valve.

(2) Remove ground check port plugs from G1 and G2 valve test ports (Ref. Fig. 501).

(3) Install 13958-1 test plug in G2 ground check port.

(4) Install 14123-1 or 14111-1 test plug in G1 ground check port.

NOTE: When using GS14111-1 plug it may be necessary to rotate the valve in the ducting or remove it from the aircraft to gain access to G1 port.

(5) Position GS9400-7 valve tester near overpressure shutoff valve.

(6) Connect test plug in G1 ground check port to test set connector P4, using AD30008-1 hose assembly.

(7) Connect test plug in G2 ground check port to test set connector P6, using AD30008-1 hose assembly.

(8) Connect valve tester to compressed air or nitrogen source (200-225 psig).

(9) Using valve tester, perform overpressure shutoff valve regulator test as follows:

(a) Open valve S4.

(b) Close 0-100 psi gage shutoff valve.

(c) Open valve S6 (connects port P6 to 0-100 psi gage).

R (d) Set 78 to 82 psig on 0-200 psi gage.

(e) Pressure on 0-100 psi gage shall be within 4 psig of pressure on 0-200 psi gage.

NOTE: If 100 psi gage pressure is low and audible air leak into valve body is detected, check condition of 'O' ring (MS28775-010) on G1 test plug.

(f) Increase pressure on 0-200 psi gage to 125 psig.

(g) Pressure on 0-100 psi gage shall not exceed 115 psig.

NOTE: Pressure on 0-100 psi gage will not exceed 115 psig as indicated by actuation of gage overpressure indicator.

(h) Decrease pressure to 0 psig.

(i) Close S4 and S6 valves. Turn off compressed air or nitrogen source.

(j) Remove hose and test plug from G1 ground check port. Install standard plug.

(k) Remove hose from test plug in G2 port. Remove tester.

(10) Position switch operation test.

(a) Install AD30786-1 shutoff valve on AD30008-2 hose. Install hose on test plug in G2 port. Close shutoff valve.

(b) On pilots overhead circuit breaker panel CB1, zone 210, verify that the applicable ENGINE BLEED CONTROL - ENG ISLN VALVES - ENG 1 (G10), 2 (G11), or 3 (G12) circuit breaker is closed.

(c) Turn on electrical power (Ref. 24-00-00).

(d) Pressurize pneumatic system (Ref. 36-00-00), using high pressure ground air source or APU (Ref. 49-00-00).

(e) Position pneumatic system controls to direct pneumatic pressure to applicable engine bleed air system (Ref. 36-00-00). Verify that system pressure is at least 25 psig.

(f) Release all ENG ISLN VALVE switchlights. Verify OFF legends on, flowbars off.

R (g) Depress applicable ENG ISLN VALVE switchlight. Verify OFF legend is off and flowbar is on.

(h) Visually check that applicable overpressure shutoff valve is open (pointer on valve shaft at 0).

R (i) Close AD30786-1 shutoff valve.

(j) Verify overpressure shutoff valve closes (pointer moves to S). Verify BLEED DUCT OVPRESS light on Flight Engineer/Second Officers (FE/SO) upper panel, zone 215, comes on. (Valve closure may be momentary with pressure from manifold side of valve.)

R (k) Open AD30786-1 shutoff valve.

(l) On aircraft 001-014 without SB 36-009, verify overpressure shutoff valve opens (pointer moves to 0), andBLEED DUCT OVPRESS light on FE/SO
R upper panel, zone 215 stays on.

(l) On aircraft 001-014 with SB36-009 and 015-999, verify overpressure shutoff valve opens (pointer moves to 0). Verify BLEED DUCT OVPRESS light on FE/SO upper panel stays on. Cycle corresponding ENG ISLN VALVE switchlight. Verify that BLEED DUCT OVPRESS light goes off.

(11) Return all pneumatic system controls to normal system ready positions (Ref. 36-00-00).

(12) Turn off pneumatic system (Ref. 36-00-00) or APU (Ref. 49-00-00).

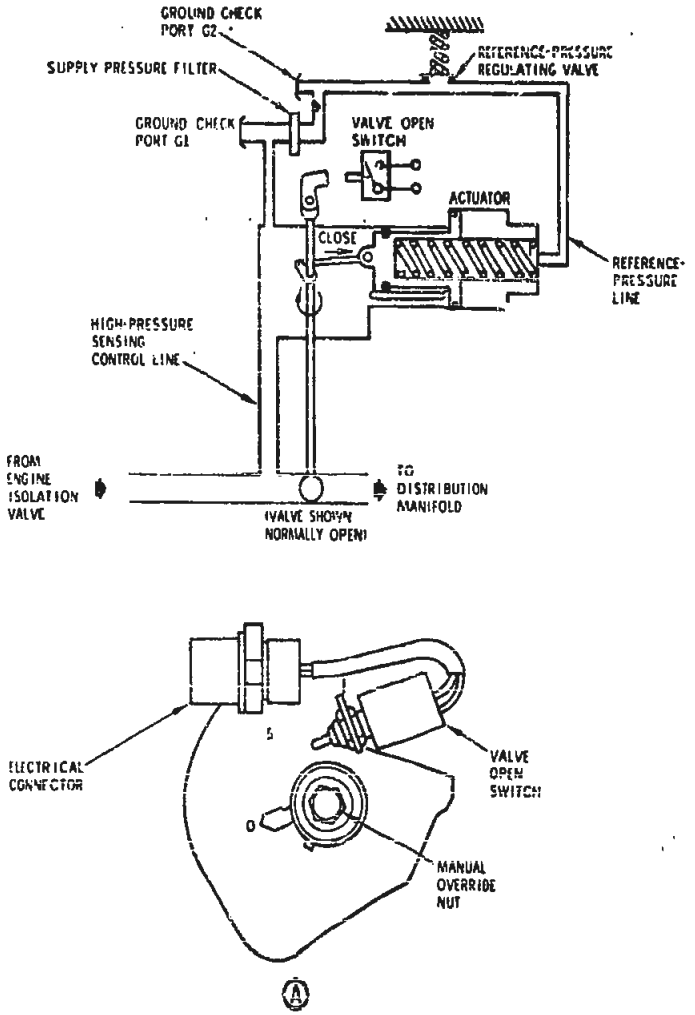
(13) Turn off electrical power (Ref. 24-00-00).

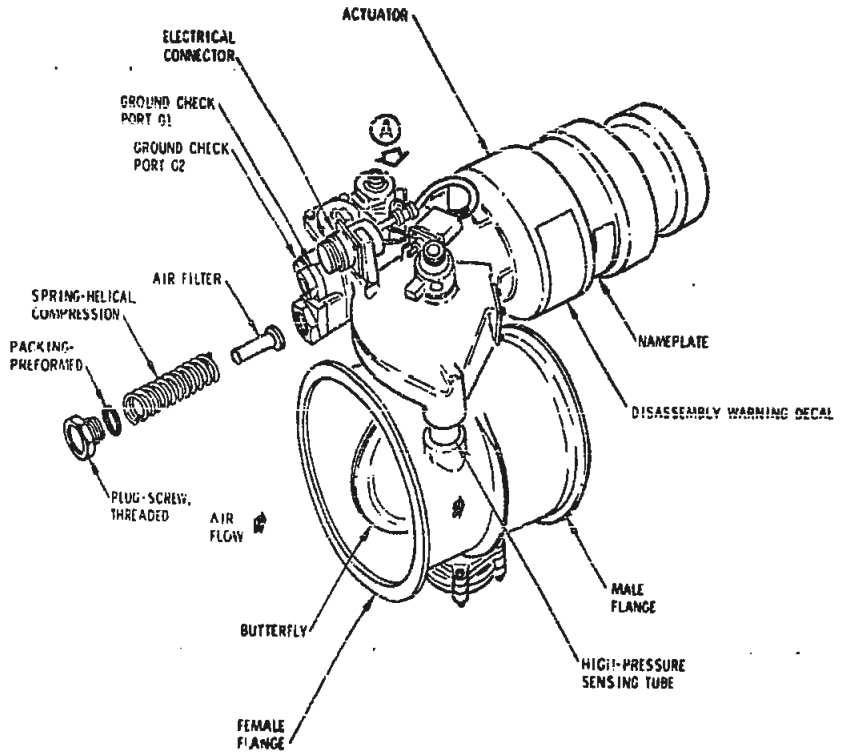
(14) Disconnect all test equipment.

(15) Remove test plug from G2 ground check port and install ground check port plug.

(16) Lockwire G1 and G2 ground check port plugs.

(17) Close/reinstall access panels opened in Step 4A(1).





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R
R

Overpressure Shutoff Valve
Figure 501

EFFECTIVITY: ALL

0018

OVERPRESSURE SHUTOFF VALVE INSPECTION AND CHECK

1. General

Units with obvious or unreparable damage should be removed and sent to overhaul.

2. Referenced Procedures

36-11-41 Overpressure Shutoff Valve - Cleaning and Painting

3. Inspection/Check

A. Inspection

(1) Inspect electrical connector for broken pins or other damage.

(2) Inspect inlet and outlet flanges for nicks, dents, or other damage.

(3) Loosen filter nut and remove filter seal. Discard seal.

(4) Inspect filter for clogged or dirty pores.

(5) If required, clean dirty or clogged filter (Ref. 36-11-41, Cleaning and Painting).

(6) Install new seal on filter.

(7) Install filter and secure with nut.

OVERPRESSURE SHUTOFF VALVE CLEANING AND PAINTING

1. Equipment and Materials

Soft-bristle brush

Petroleum Solvent, Spec AMS31608, or equivalent

Lint-free cloth

2. Referenced Procedure

36-11-41 Overpressure Shutoff Valve - Inspection and Check

3. Cleaning/Painting

A. Cleaning

WARNING: USE PETROLEUM SOLVENTS ONLY IN A WELL-VENTILATED AREA AND WITH PROPER PRECAUTIONS TO PREVENT FIRE. WEAR GOGGLES WHEN USING COMPRESSED AIR TO DRY PARTS.

CAUTION: USE COMPRESSED AIR CAREFULLY ON FINE-MESH FILTER SCREEN TO PREVENT DAMAGE.

(1) Clean dirty or clogged filter (Ref. 36-11-41, Inspection and Check) with solvent. Use a soft-bristle brush or immerse and agitate filter in solvent.

(2) Clean all exterior surfaces of valve with a lint-free cloth dampened in solvent.

(3) Dry unit with dry, filtered, compressed air.

HIGH-PRESSURE OVERPRESSURE SWITCH - MAINTENANCE PRACTICES

1. General

The engine high-pressure (HP) over-pressure switches are fast-acting non-latching pressure vents that rapidly close. The high-pressure valve when duct pressure in that system exceeds 160 PSIG.

2. Referenced Procedure

36-11-01 Engine High-pressure Valve - Maintenance Practices

3. Maintenance Practices

A. Deactivation

RRR NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

(1) If engine isolation valve and overpressure shutoff valve are not fully operative, deactivate engine high-pressure valve on engine with inoperative engine high-pressure overpressure switch (Ref 36-11-01).

(2) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, zone 215, placard applicable HI PRESS switchlight OVERPRESSURE SWITCH INOPERATIVE, HI PRESS VALVE DEACTIVATED.

(3) Make appropriate entry in aircraft log book.

HIGH-PRESSURE OVERPRESSURE SWITCH REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for No. 1, No. 2 and No. 3 high-pressure overpressure switches, except for the access panel references. The switch is located next to the respective high-pressure valve in the splitter, zone 3.

2. Reference Procedures

R 6-50-00 Interior Access Doors and Removable Panels

36-11-00 Engine Bleed Air - Adjustment and Test

3. Removal/Installation

A. Removal

(1) Placard Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) Install splitter area access work platform (Ref. Fig. 401).

(3) Remove access panels 418BR for ENG. 1, 428BR for ENG. 2, 438BR for ENG. 3 (Ref. 6-50-00).

R

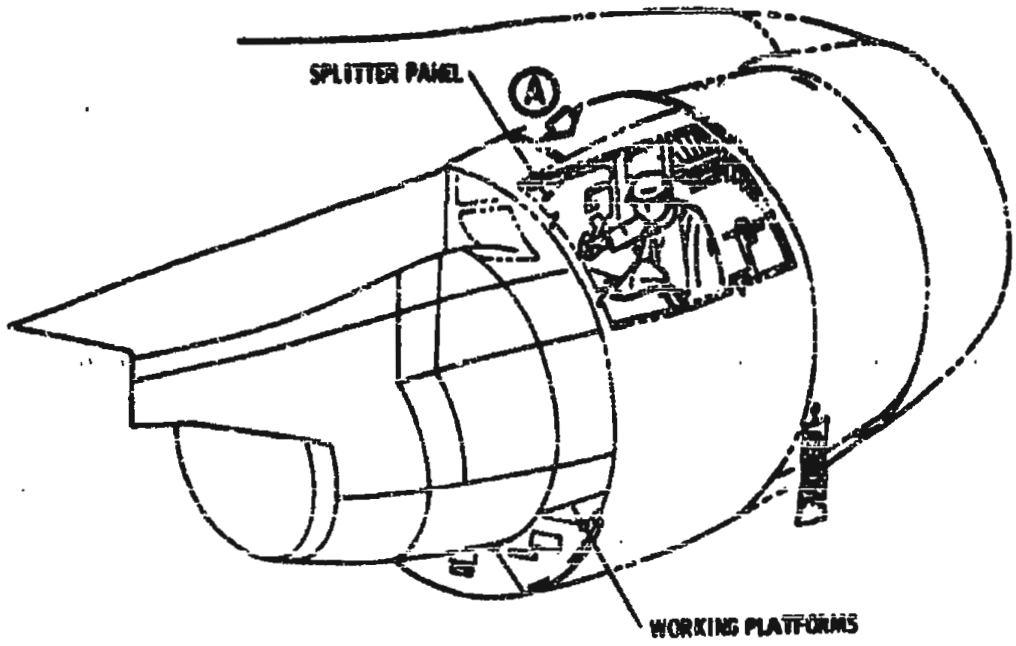
WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Disconnect four tubings (from Engine High Pressure Duct, HP Valve controller and two from HP valve) from high pressure overpressure switch, and cap tubings.

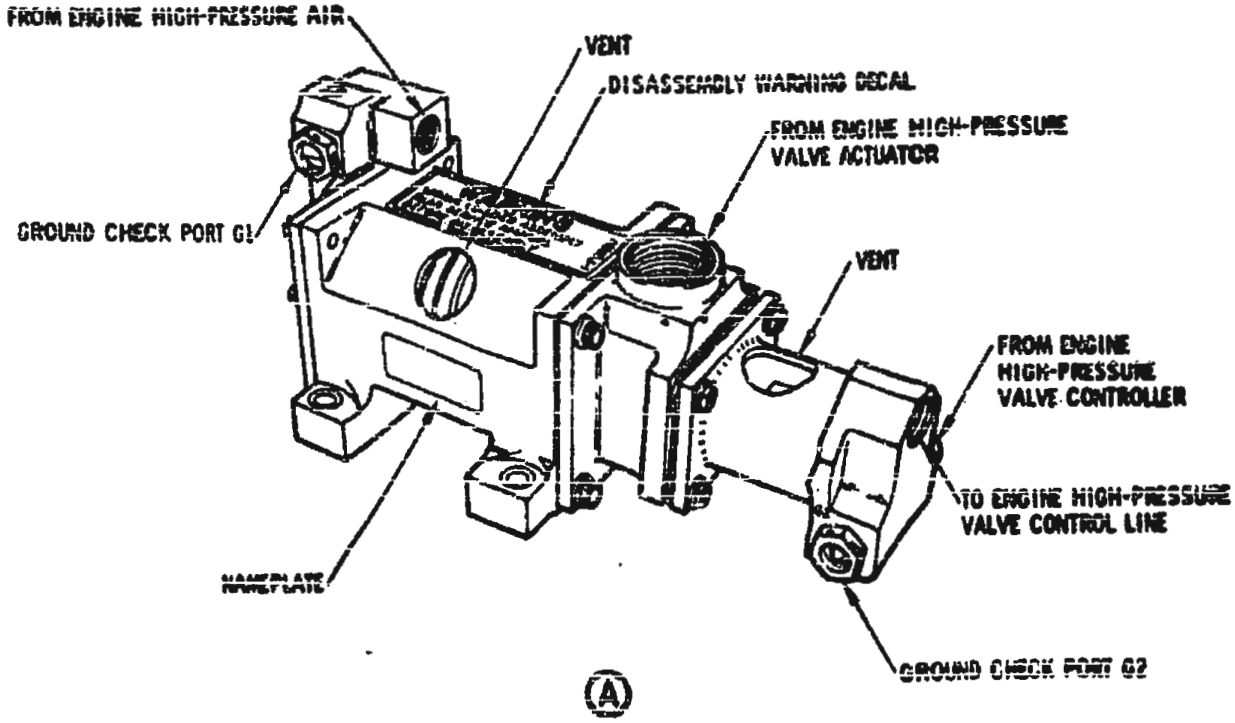
(5) Remove four mounting bolts and washer from base of high pressure overpressure switch and save bolts and washers for reuse.

(6) Remove high-pressure overpressure switch.

(7) Remove four adapters and seals from overpressure switch and save adapters and seals for reuse.



TYPICAL - ENGINE NO. 1 OR 3



M1-0100-36-007

R
R

Engine High-Pressure Overpressure Switch
Figure 401

EFFECTIVITY: ALL

001B

B. Installation

R (1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure air connections are in place.

R (2) Install four seals and adapters to the four ports of high pressure overpressure switch and tighten adapters.

R (3) Install high pressure switch with four bolts and washers, and tighten bolts.

R (4) Install four tubings (from high pressure duct, HP valve controller and two from HP valve) on corresponding adapters and tighten adapter and tubing.

R (5) Install access panel removed in Step 3A(3).

R (6) Remove wash platform installed in Step 3A(2).

R (7) Remove placards installed in Step 3A(1)

R (8) Perform Engine Bleed Air adjustment and test (36-11-00) for the affected system.

HIGH-PRESSURE OVERPRESSURE SWITCH - ADJUSTMENT AND TEST

1. General

The three engine high-pressure overpressure switches, one in each of the engine bleed air systems, are identical. The switches are not adjustable on the aircraft. Functional test procedures are the same for all switches except for access panel references.

2. Equipment and Materials

Valve Tester, GS9400-7, Hamilton Standard, or equivalent

Test Plug, GS13841-1 or GS14099-1, Hamilton Standard (2 required), or equivalent

Hose Assembly, AD30008-1, Hamilton Standard (2 required), or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or Splitter area access work platform PN CP2039 or XUT. 37594, Rolls-Royce Ltd., or equivalent

3. Reference Procedure

R

6-50-00	Interior Access Doors and Removable Panels
24-00-00	Electrical Power System - Maintenance Practices
78-30-00	Engine Thrust Reverser-Servicing

4. Adjustment/Test

A. Functional Test

WARNING: THE ENGINE THRUST REVERSER MUST BE DEACTIVATED IN THE RETRACTED POSITION (REF. 78-30-00, THRUST REVERSER - SERVICING).

(1) Install splitter area access work platform in engine cold stream duct.

(2) Remove access panels 418BR for ENG. 1, 428BR for ENG. 2, 438BR for ENG. 3 (Ref. 6-50-00). R

(3) Remove ground check port plugs from G1 and G2 switch test ports (Ref. Fig. 501).

R (4) Install GS14099-1 or GS13841-1 test plug in G1 ground
R check port.

R (5) Install GS13841-1 or GS14099-1 test plug in G2 ground check port.

(6) Position GS9400-7 valve tester near high-pressure overpressure switch.

(7) Connect test plug in G1 ground check port to tester connector P4, using AD30008-1 hose assembly.

(8) Connect test plug in G2 ground check port to tester connector P3, using AD30008-1 hose assembly.

(9) Connect valve tester to compressed air or nitrogen source (200-225 psig). Close all tester valves and turn on pressure source.

(10) On pilots overhead circuit breaker panel CB1, zone 210, verify that the applicable ENGINE BLEED CONTROL - HI PRESS VALVES - 1 (G13), 2 (G14), or 3 (G15) circuit breaker is closed.

(11) Turn on electrical power (Ref. 24-41-00).

(12) On ENGINE BLEED CONTROL panel, release applicable HI PRESS switchlight to off position. OFF legend shall be on, flow bar off.

(13) Depress applicable HI PRESS switchlight to on position. OFF legend shall go off, flow bar remain off.

(14) Set valve tester pressure selector to position B.

(15) Open valve S3 and 0-100 psi control to set 30 psig on 0-100 psi gage. Engine high-pressure valve shall open and the flow bar in the HI PRESS switchlight on the ENGINE BLEED CONTROL panel shall come on.

(16) Open valve S4 and 0-200 psi control to set 147 psig on 0-200 psi gage. The engine high-pressure valve shall remain open and the switchlight flow bar on.

(17) Increase pressure on 0-200 psi gage to 167 psig. The engine high-pressure valve shall close and the HI PRESS switchlight flow bar shall go off (pressure of 30 psig on 0-100 psi gage need not be maintained).

(18) Close S3 and S4 valves. Turn off and disconnect compressed air or nitrogen source.

(19) Disconnect AD30008-1 hose assembly from tester connector P3 and GS13841-1 or GS14099-1 test plug in switch.

(20) Disconnect AD30008-1 hose assembly from tester connector P4 and GS14099-1 or GS13841-1 test plug in switch.

(21) Remove valve tester.

(22) Remove GS14099-1 or GS13841-1 test plug from G1 ground check port and install check port plug.

(23) Remove GS1384-1 or GS14099-1 test plug from G2 ground check port and install check port plug.

(24) Lock-wire G1 and G2 check port plugs.

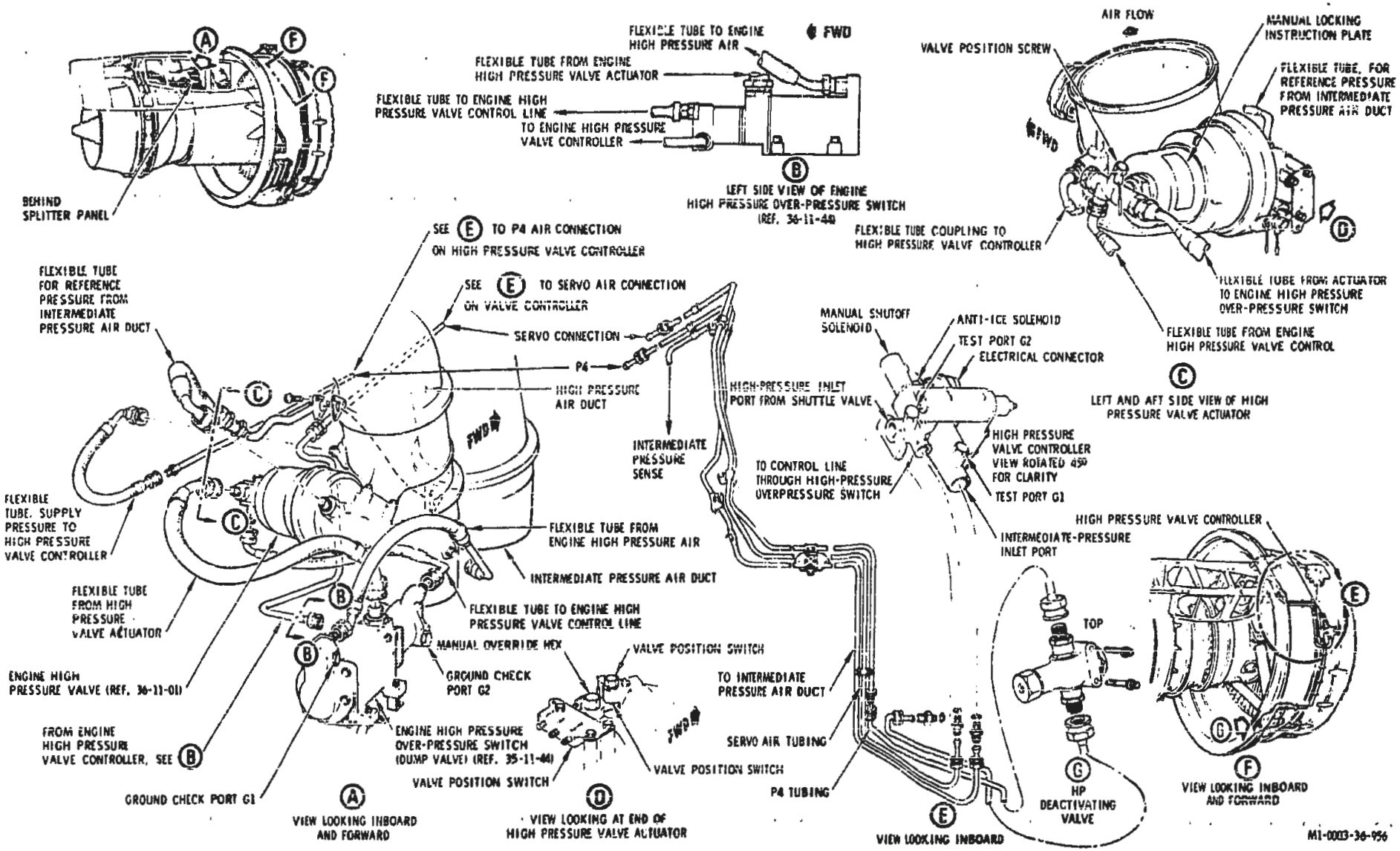
(25) Check that all flexible pneumatic plumbing is correctly connected (Ref. Fig. 501).

(26) Install access panel removed in Step 4A(2).

(27) Turn off electrical power (Ref. 24-00-00).

(28) Remove splitter area access work platform from engine cold stream duct.

(29) Reactivate engine thrust reverser.


BEHIND SPLITTER PANEL
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE AIR
FWD
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
TO ENGINE HIGH PRESSURE VALVE CONTROLLER
B
LEFT SIDE VIEW OF ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (REF. 36-11-44)
AIR FLOW
VALVE POSITION SCREW
MANUAL LOCKING INSTRUCTION PLATE
FLEXIBLE TUBE, FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
FWD
FLEXIBLE TUBE COUPLING TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM ACTUATOR TO ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE VALVE CONTROL
SEE E TO P4 AIR CONNECTION ON HIGH PRESSURE VALVE CONTROLLER
SEE E TO SERVO AIR CONNECTION ON VALVE CONTROLLER
FLEXIBLE TUBE FOR REFERENCE PRESSURE FROM INTERMEDIATE PRESSURE AIR DUCT
SERVO CONNECTION
P4
HIGH PRESSURE AIR DUCT
FWD
INTERMEDIATE PRESSURE SENSE
HIGH-PRESSURE INLET PORT FROM SHUTTLE VALVE
MANUAL SHUTOFF SOLENOID
ANTI-ICE SOLENOID
TEST PORT G2
ELECTRICAL CONNECTOR
C
LEFT AND AFT SIDE VIEW OF HIGH PRESSURE VALVE ACTUATOR
HIGH PRESSURE VALVE CONTROLLER VIEW ROTATED 45° FOR CLARITY
TO CONTROL LINE THROUGH HIGH-PRESSURE OVERPRESSURE SWITCH
TEST PORT G1
INTERMEDIATE-PRESSURE INLET PORT
HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE, SUPPLY PRESSURE TO HIGH PRESSURE VALVE CONTROLLER
FLEXIBLE TUBE FROM ENGINE HIGH PRESSURE AIR
INTERMEDIATE PRESSURE AIR DUCT
FLEXIBLE TUBE FROM HIGH PRESSURE VALVE ACTUATOR
FLEXIBLE TUBE TO ENGINE HIGH PRESSURE VALVE CONTROL LINE
MANUAL OVERRIDE HEX
VALVE POSITION SWITCH
GROUND CHECK PORT G2
TO INTERMEDIATE PRESSURE AIR DUCT
ENGINE HIGH PRESSURE VALVE (REF. 36-11-01)
FROM ENGINE HIGH PRESSURE VALVE CONTROLLER, SEE B
ENGINE HIGH PRESSURE OVER-PRESSURE SWITCH (DUMP VALVE) (REF. 35-11-44)
SERVO AIR TUBING
VALVE POSITION SWITCH
VALVE POSITION SWITCH
P4 TUBING
GROUND CHECK PORT G1
A
VIEW LOOKING INBOARD AND FORWARD
D
VIEW LOOKING AT END OF HIGH PRESSURE VALVE ACTUATOR
E
VIEW LOOKING INBOARD
TOP
G
HP DEACTIVATING VALVE
F
VIEW LOOKING INBOARD AND FORWARD
M1-0003-36-956

R Engine High-pressure Overpressure Switch
R Figure 501

EFFECTIVITY: ALL

0018

WING ENGINE STARTER DUCT - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures for the No. 1 and No. 3 engine starter ducts are the same except for access panel references.

2. Referenced Procedure

20-00-06 Safetying Procedures

20-36-02 Double T-bolt V-band Coupling - Removal and Installation

3. Removal/Installation

R A. Removal

R WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED
R AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Remove access panels 452AT, 452BT, and 452CT for engine No. 1 duct or 462AT, 462BT, and 462CT for engine No. 3 duct (Ref. Fig. 401).

(2) Remove screws from each end of leading edge supports at pylon stations 145 and 190 and remove supports.

(3) Remove safety wire from coupling covers (Ref. 20-00-06).

(4) Remove couplings (Ref. 20-36-02) from long starter duct section.

(5) Remove bolt from lower side of bracket on long duct section above the mixing ejector and remove duct.

(6) Install protective covers on ducts.

B. Installation

R R R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND AIR CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(2) Insert long duct section in top of pylon with short bent section forward.

(3) Attach link to duct using bolt removed in Step 3A(4).

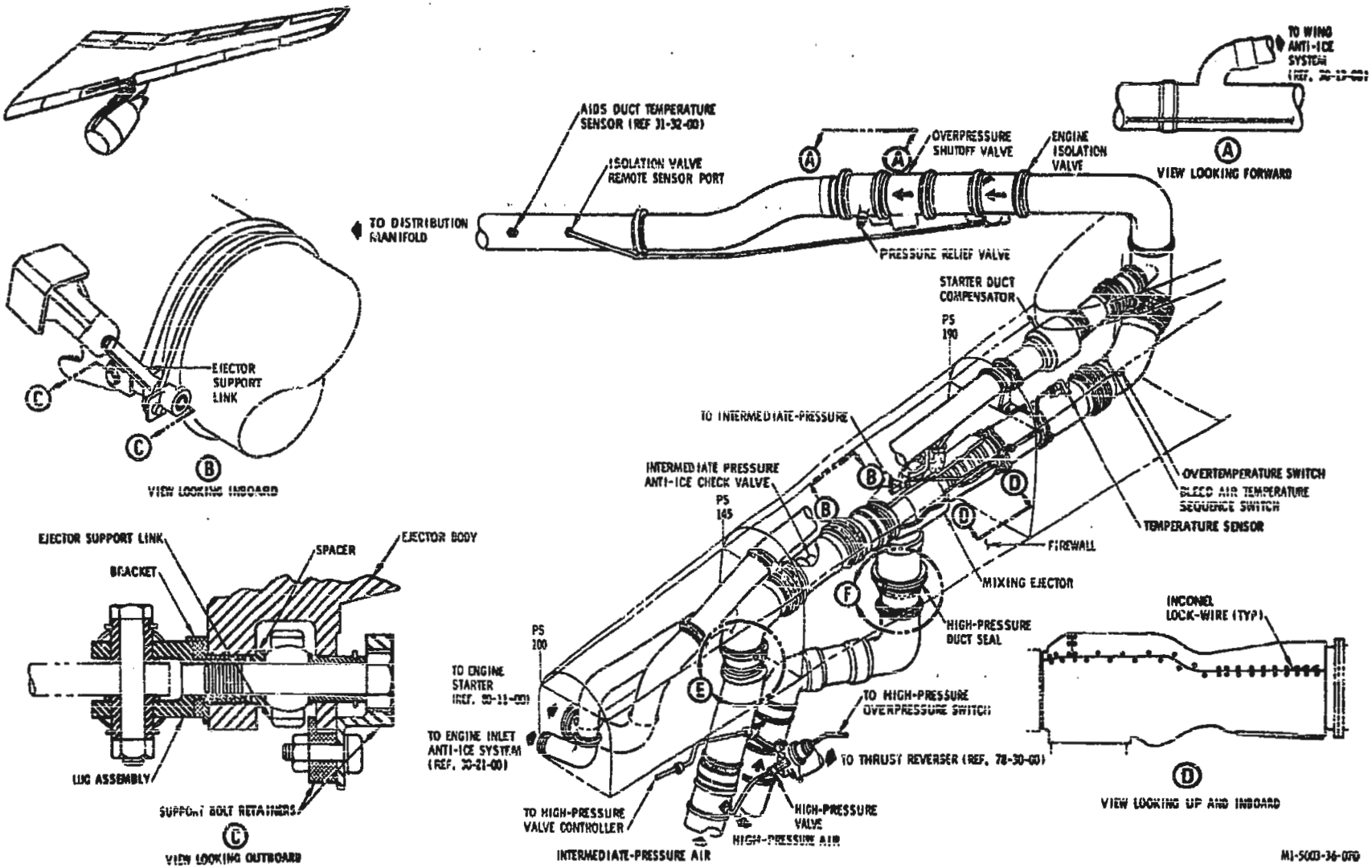
(4) Insert seals in duct flanges, mate flanges, and install couplings (Ref. 20-36-02). Couplings may be positioned in the pylon to provide the best access to latching mechanism but no part of the coupling, including the latching mechanism, may be less than 0.50 inch clearance with adjacent systems or structures.

(5) Secure coupling covers with safety wire (Ref. 20-00-06).

(6) Install leading edge supports removed in Steps 3A(2).

(7) Install access panels removed in Step 3A(1).

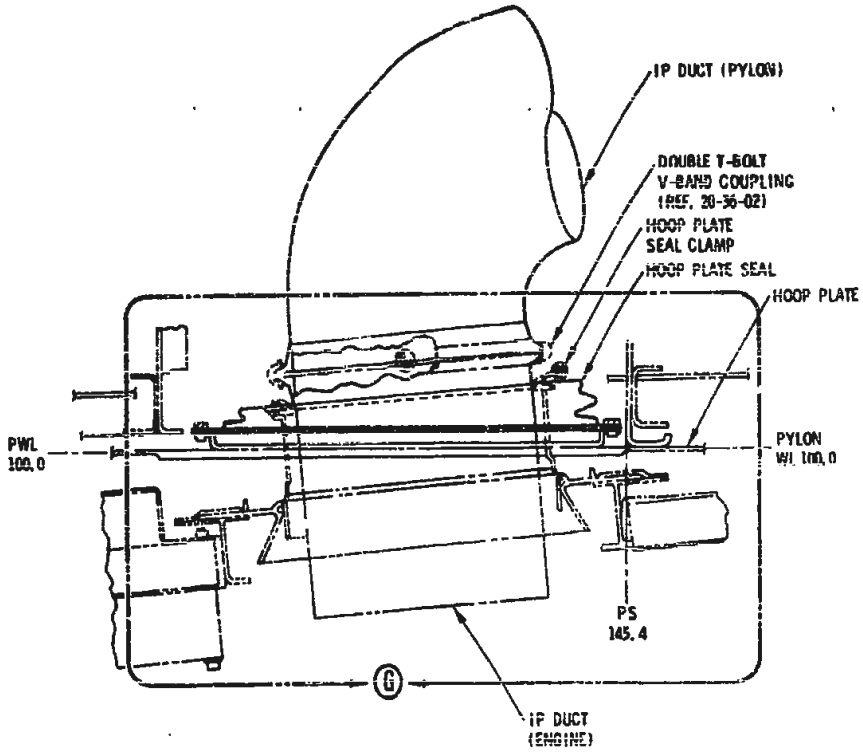
(8) Remove placards installed in Paragraph 3.



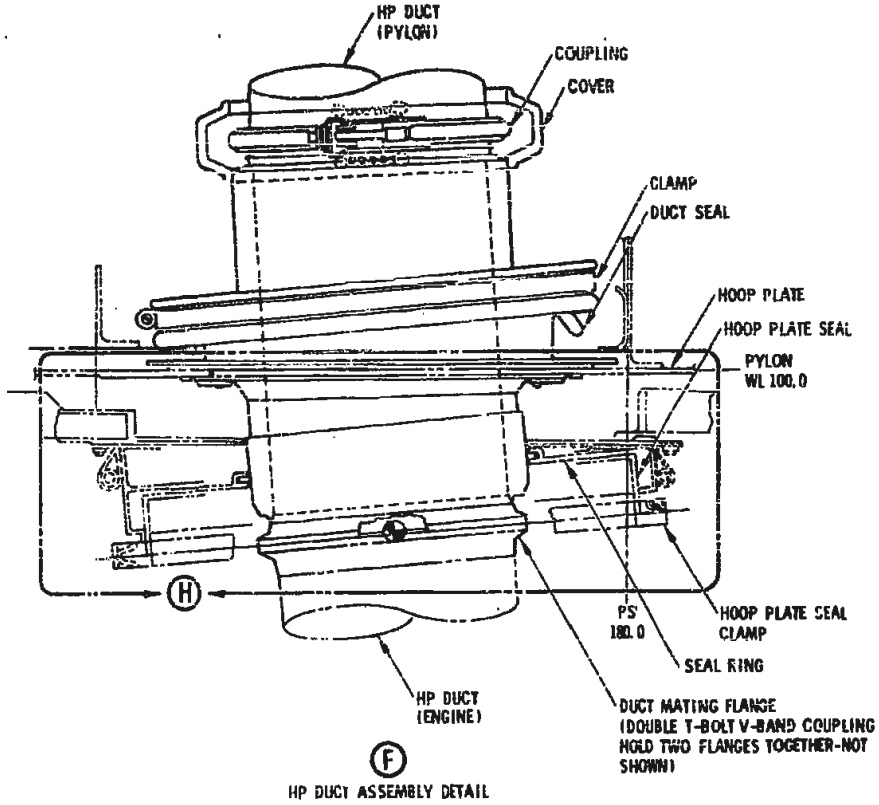
R Wing Engine Bleed Air System Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL

0018



E
IP DUCT ASSEMBLY DETAIL



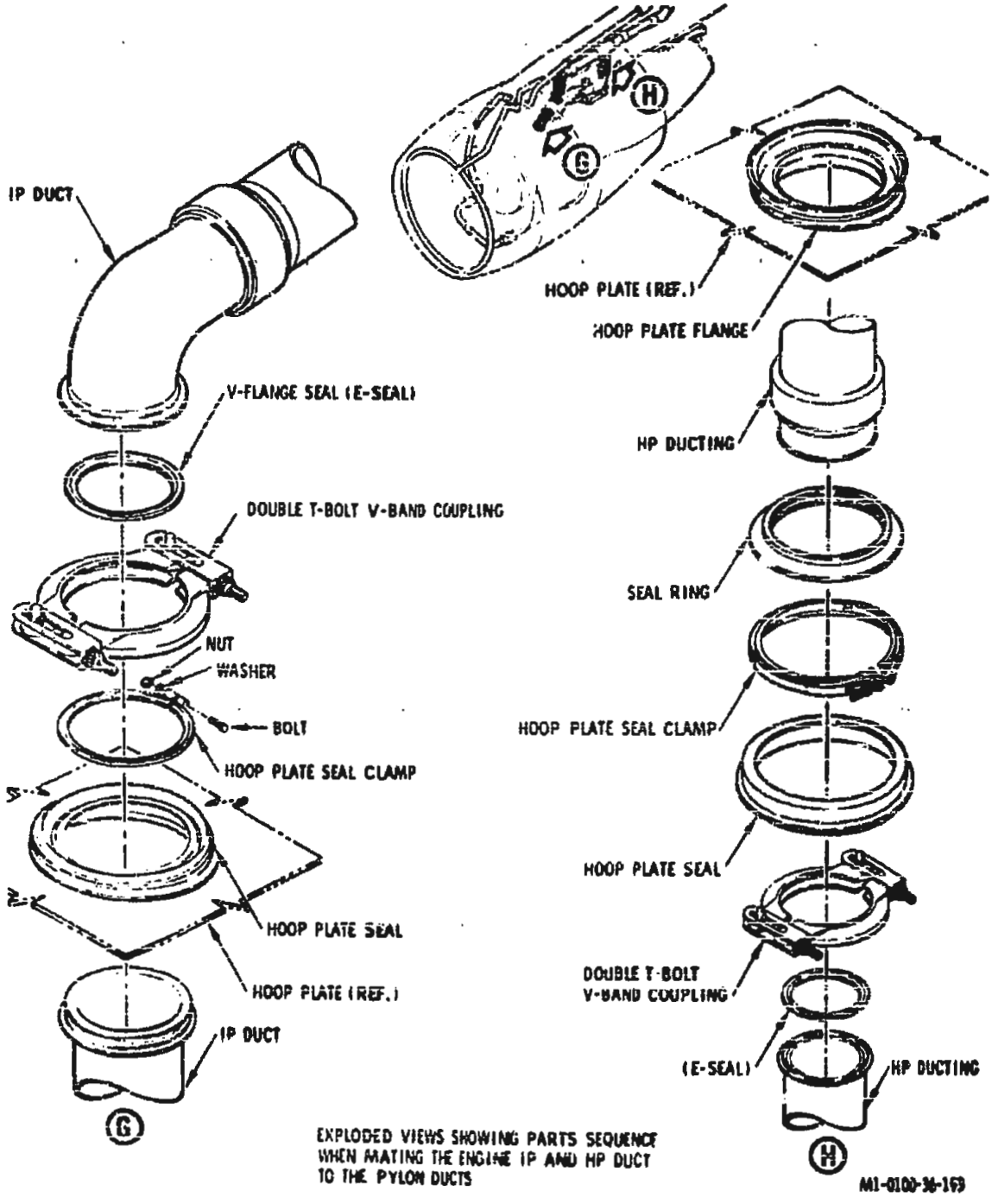
F
HP DUCT ASSEMBLY DETAIL

A11-0100-36-192

R Wing Engine Bleed Air System Installation
R Figure 401 (Sheet 2)

R EFFECTIVITY: ALL

001B



Wing Engine Bleed Air System Installation
Figure 401 (Sheet 3)

R

EFFECTIVITY: ALL

0016

WING ENGINE HIGH-PRESSURE DUCT - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for both the No. 1 and No. 3 engine high-pressure ducts except for access
R panel references. The wing engine (No. 1 and No. 3)
R high-pressure ducts are installed in pylon area, zones 450 and
R 460.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Splitter Area Access Work Platform

3. Referenced Procedures

20-36-02	Double T-bolt V-band coupling - Removal and Installation
36-00-00	Pneumatic System - Maintenance Practices
36-11-08	Mixing Ejector - Removal and Installation
36-11-33	Wing Engine High-Pressure Bleed Air Duct Seal - Removal and Installation
36-11-47	Wing Engine Starter Duct - Removal and Installation
78-30-00	Thrust Reverser Serving

4. Removal/Installation

A. Removal

R WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On the pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - HI PRESS VALVES - ENG 1 (G-13) or ENG 3 (G15).

(2) Install thrust reverser deactivator pip-pin (Ref. 78-30-00).

(3) Install splitter access work platform in the engine cold stream collector nozzle (Ref. Fig. 401 and 402).

R (4) On aircraft 001-027, 030-999,
R remove splitter access panels 418AL, 418AR, 418BL and
R 418BR for engine No. 1 duct or 438AL, 438AR, 438BL and
R 438BR for engine No. 3 duct.

R (4) On aircraft 028-029,
R remove splitter access panels 418FL5, 418FR5, 418BL5
R and 418BR5 for engine No. 1 duct or 438FL5, 438FR5,
R 438BL5 and 438BR5 for engine No. 3 duct.

NOTE: Working from both sides will facilitate removal.

(5) Remove coupling from around high-pressure duct that extends down through the hoop plate (Ref. 20-36-02).

(6) Remove coupling from around high-pressure valve.

(7) Remove brace on HP duct below hoop plate.

(8) Remove pylon access panels 452AT, 452BT, and 452CT for engine No. 1 duct or 462AT, 462BT, and 462CT for engine No. 3 duct and leading edge supports.

(9) Remove starter duct section above the mixing ejector (Ref. 36-11-47).

(10) Remove the mixing ejector (Ref. 36-11-08).

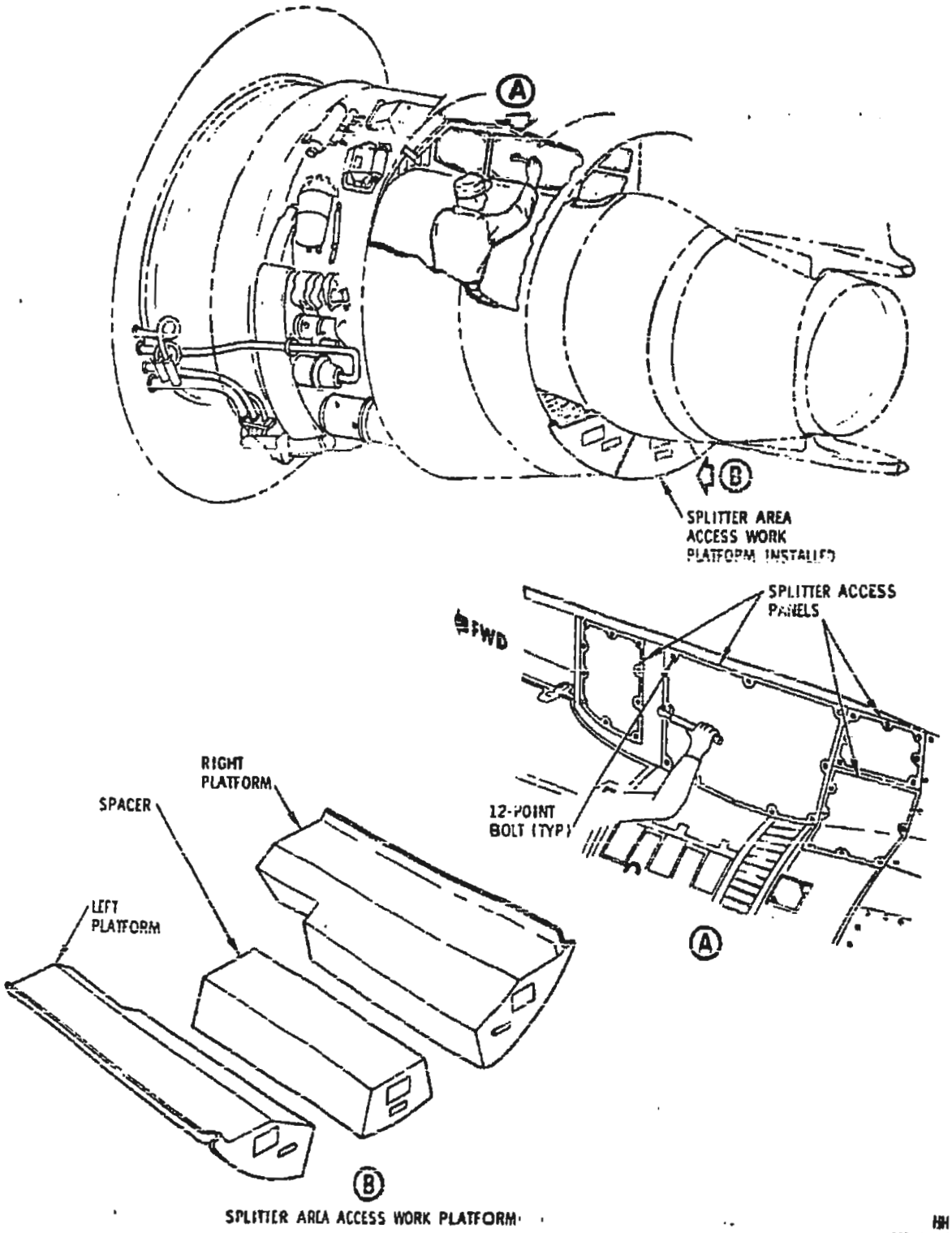
(11) Remove clamps from around the high-pressure duct seal and carefully pull duct out of hoop plate.

NOTE: Check high-pressure duct seal to see if replacement is necessary (Ref. 36-11-33).

(12) Install protective covers over ducts.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.



Splitter Area Access Work Platform
Figure 401

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(3) Carefully push the high-pressure duct through the flame shield above the hoop plate and press the duct seal flange into the mating seal.

(4) Install seal in high-pressure duct flange.

R CAUTION: MAKE SURE INTERMEDIATE-PRESSURE DUCT INDEX ARROW POINTS FORWARD.

(5) Install mixing ejector (Ref. 36-11-08).

(6) Install coupling around mated high-pressure duct flanges (Ref. 20-36-02).

(7) Install Coupling around high-pressure valve.

(8) Install brace to HP duct.

(9) Pressurize distribution manifold system (Ref. 36-00-00).

(10) On the base of the center console, lift APU/GND AIR THRUST REVERSER HOLD SWITCH.

(11) Check for leakage around pneumatic ducting.

(12) Release APU/GND AIR THRUST REVERSER HOLD SWITCH.

(13) Depressurize distribution manifold system (Ref. 36-00-00).

(14) Install splitter access panels removed in Step 4A(4).

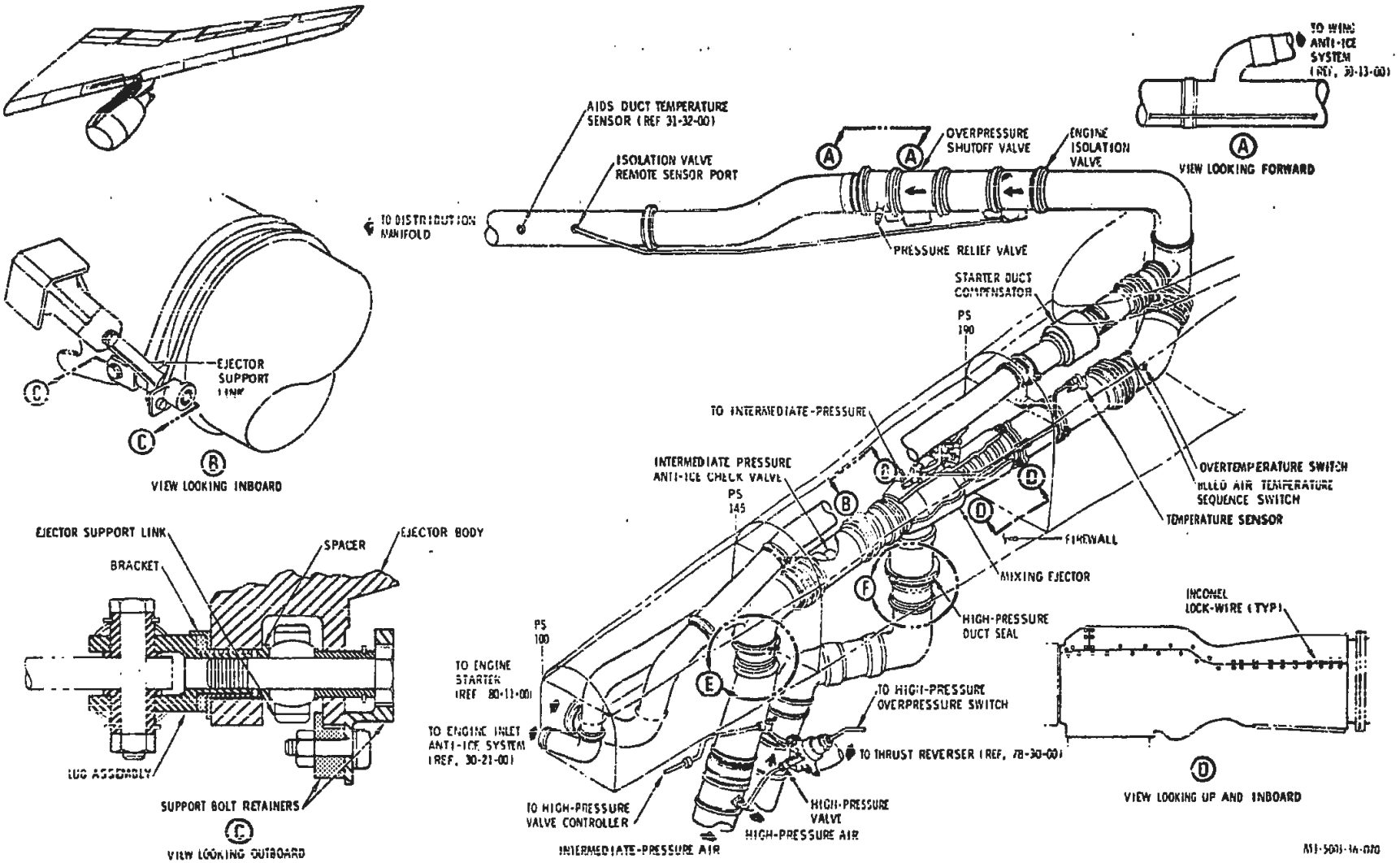
(15) Remove splitter access work platform installed in Step 4A(3).

(16) Remove the thrust reverser deactivation pip-pin (Ref. 78-30-00).

(17) Install starter duct section (Ref. 36-11-47).

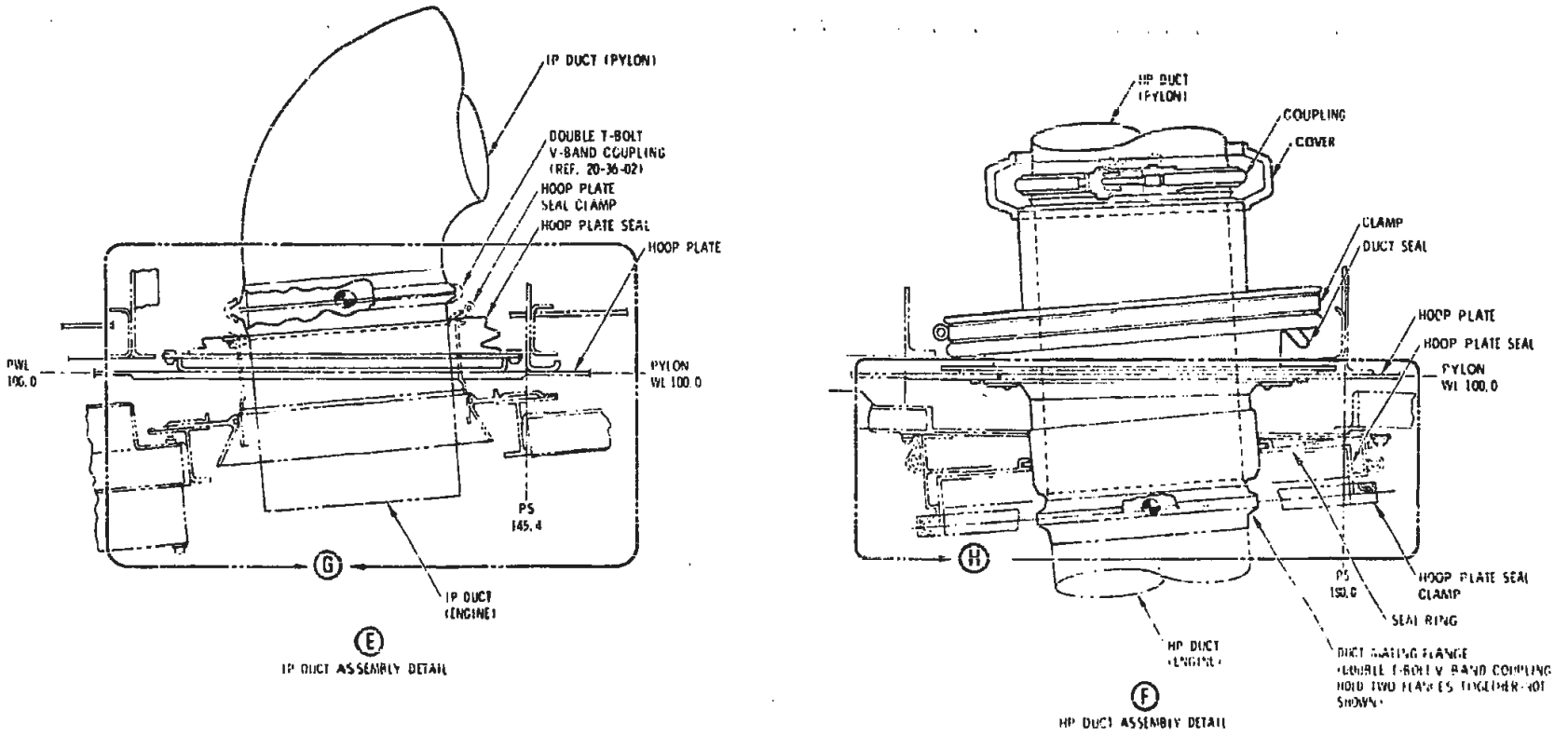
(18) Install pylon access panels removed in Step 4A(8).

(19) Remove tag and close circuit breaker opened in Step A(1).



Wing Engine Bleed Air System Installation
Figure 402 (Sheet 1)

R
R
0018 EFFECTIVITY: ALL



Wing Engine Bleed Air System Installation
Figure 402 (Sheet 2)

R
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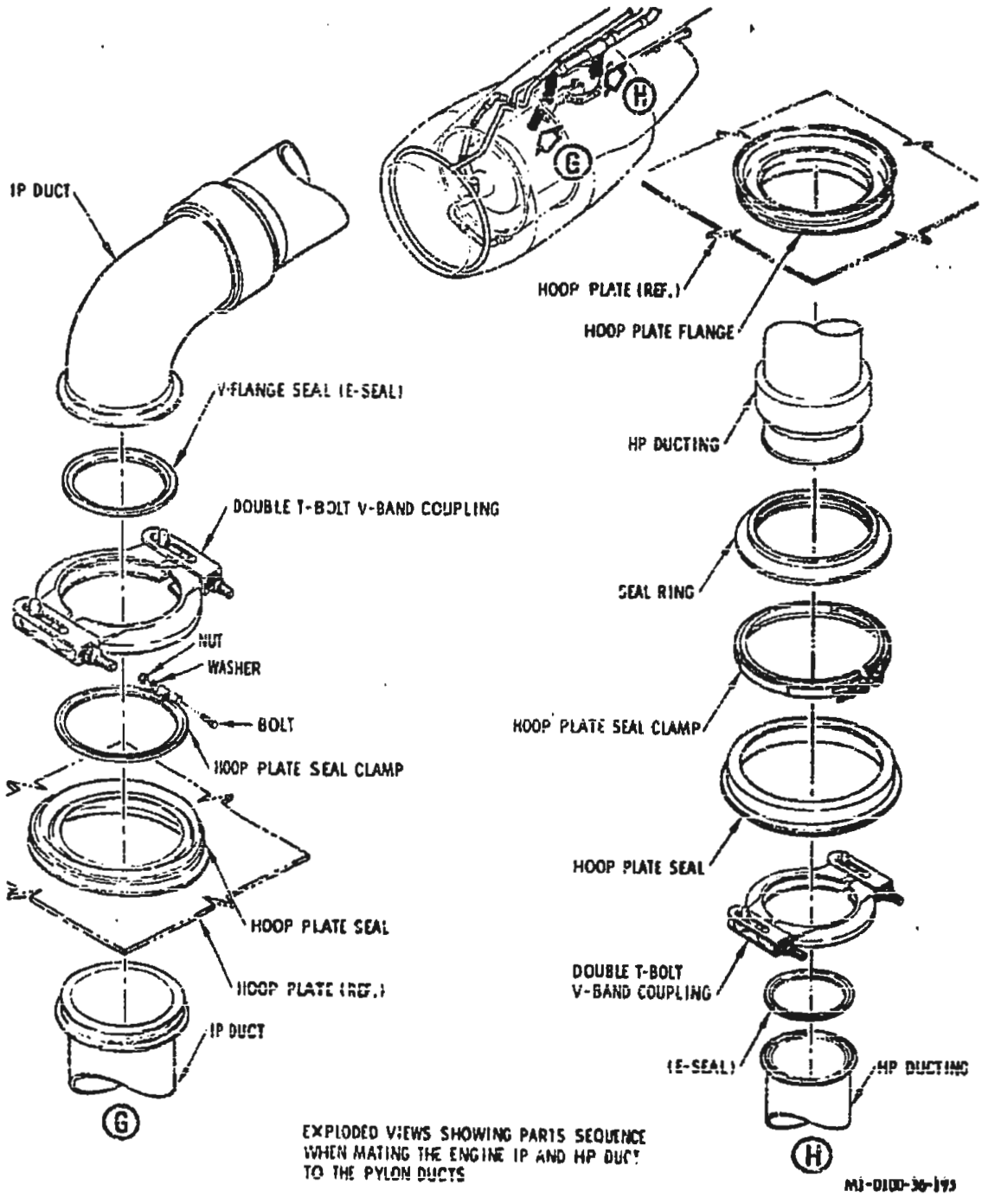
0018 EFFECTIVITY: ALL



Wing Engine Bleed Air System Installation
Figure 402 (Sheet 3)

(20) Remove placards installed in Paragraph 4A.

BLEED AIR TEMPERATURE SEQUENCE SWITCH REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the No. 1, No. 2, and No. 3 engine bleed air temperature sequence switches, except for circuit breaker and access panel references. The wing engine (No. 1 and No. 3) bleed air temperature sequence switches are located in the pylon ducting, downstream of the ejector, zones 452 and 462, (Ref. Fig. 401). The center engine (No. 2) bleed air temperature sequence switch is located in the center engine support structure, installed in the lower right side of the T-duct aft of the engine isolation valve, zone 471, (Ref. Fig. 402). To remove the wing engine temperature sequence switches, it is necessary to first remove the starter duct
R compensator.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

3. Referenced Procedure

36-11-27 Wing Engine Starter Duct Compensator - Removal and Installation

4. Removal/Installation

A. Removal

R (1) Placard Flight Engineer/Second Officers (FE/SO) bleed
R air and APU control panels and the three high-pressure
R ground air connections to prevent operation until
R completion of procedures.

R (2) On pilots overhead circuit breaker panel, CB1, zone 210, open and tag the following applicable circuit breaker:

ENGINE BLEED CONTROL - HI PRESS - ENG 1 (G13),

ENGINE BLEED CONTROL - HI PRESS - ENG 2 (G14),

ENGINE BLEED CONTROL - HI PRESS - ENG 3 (G15).

(3) Remove pylon access panel 452CT for engine No. 1 switch or 462CT for engine No. 3 switch. Remove center engine
R support structure right side access panel 471BL for engine No. 2 switch.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Engine No. 1 or No. 3 only: Remove wing engine starter duct compensator (Ref. 36-11-27).

(5) Unscrew connector collar and disconnect plug connector from switch receptacle connector.

(6) Unscrew switch and raise out of duct.

(7) When probe clears duct, remove switch and seal. Retain seal for use when installing another switch.

(8) Install protective plug in duct boss.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

(3) Inspect seal for damage, replace if necessary. Install seal over switch probe.

(4) Remove protective plug and install probe in duct.

(5) Torque switch 340 to 500 lb in. and secure with lock-wire.

CAUTION: ENSURE THAT CONNECTOR KEY AND SLOT ARE ALIGNED WHEN JOINING PLUG CONNECTOR TO RECEPTACLE CONNECTOR.

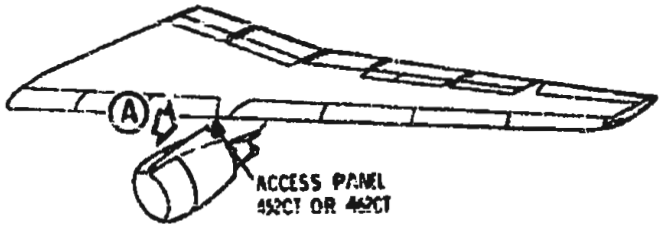
(6) Install plug connector and tighten connector collar.

(7) Engine No. 1 or No. 3 only: Install wing engine starter duct compensator (Ref. 36-11-27).

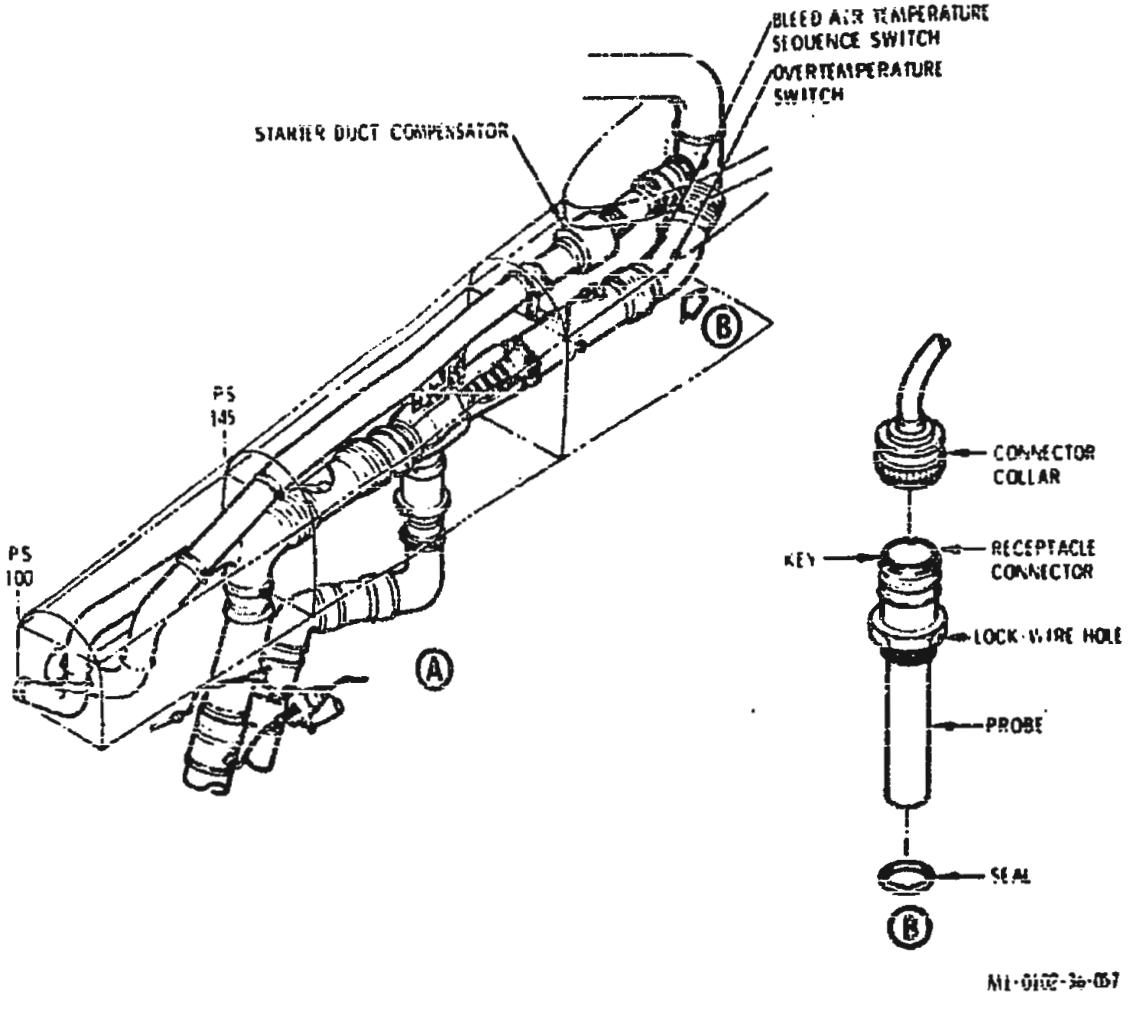
(8) Install access panel removed in Step 4A(3).

R (9) Remove tag and close circuit breaker opened in Step
R 4A(2).

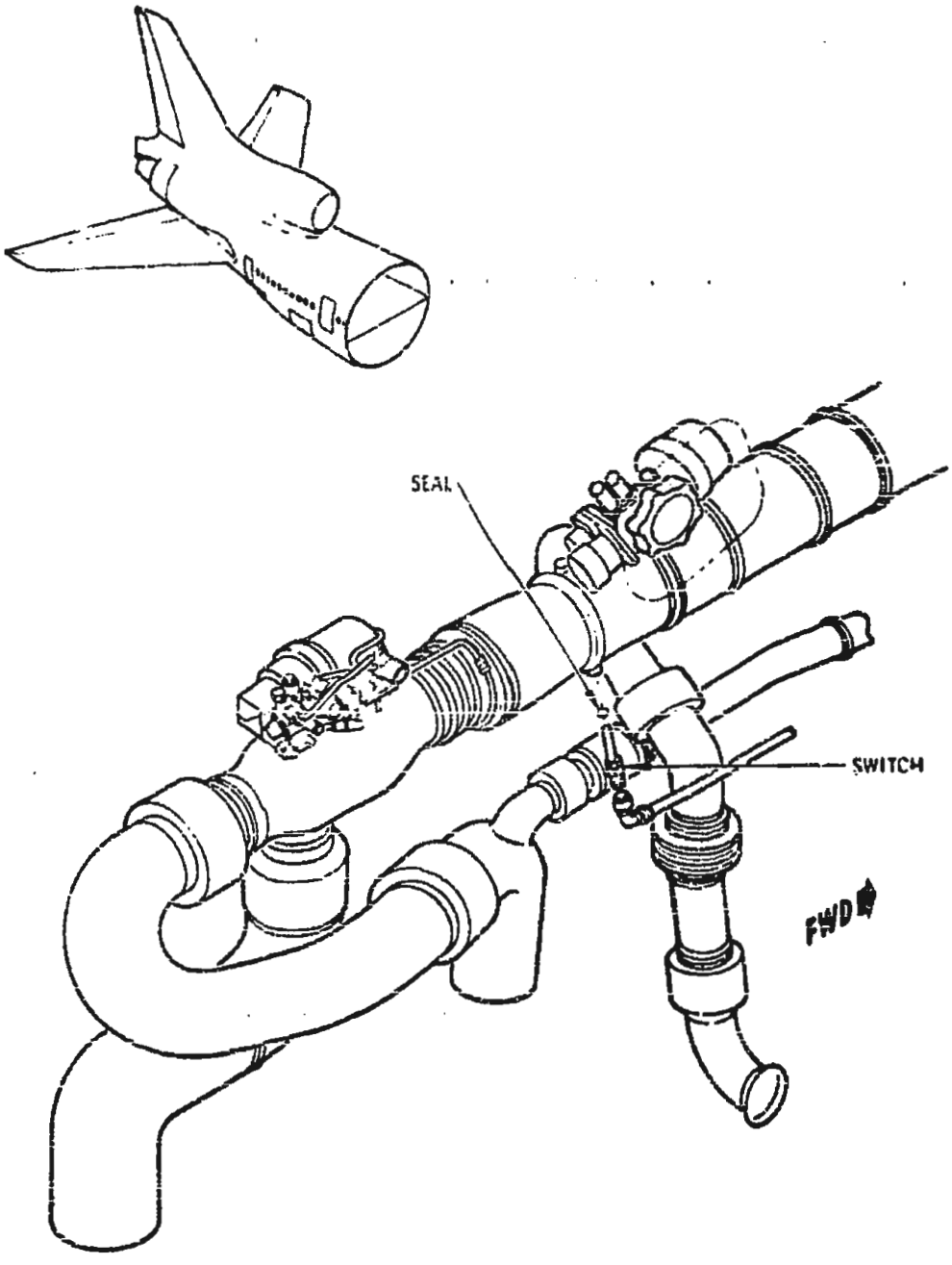
R (10) Remove placards installed in Step 4A(1).



ZONE 452 AND 462



Wing Engine Bleed Air Temperature Sequence Switch
Removal and Installation
Figure 401



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Engine No. 2 Bleed Air Temperature Sequence Switch
Removal and Installation
Figure 402

AUXILIARY POWER UNIT (APU) LOAD COMPRESSOR AIR SYSTEM DESCRIPTION AND OPERATION

1. General

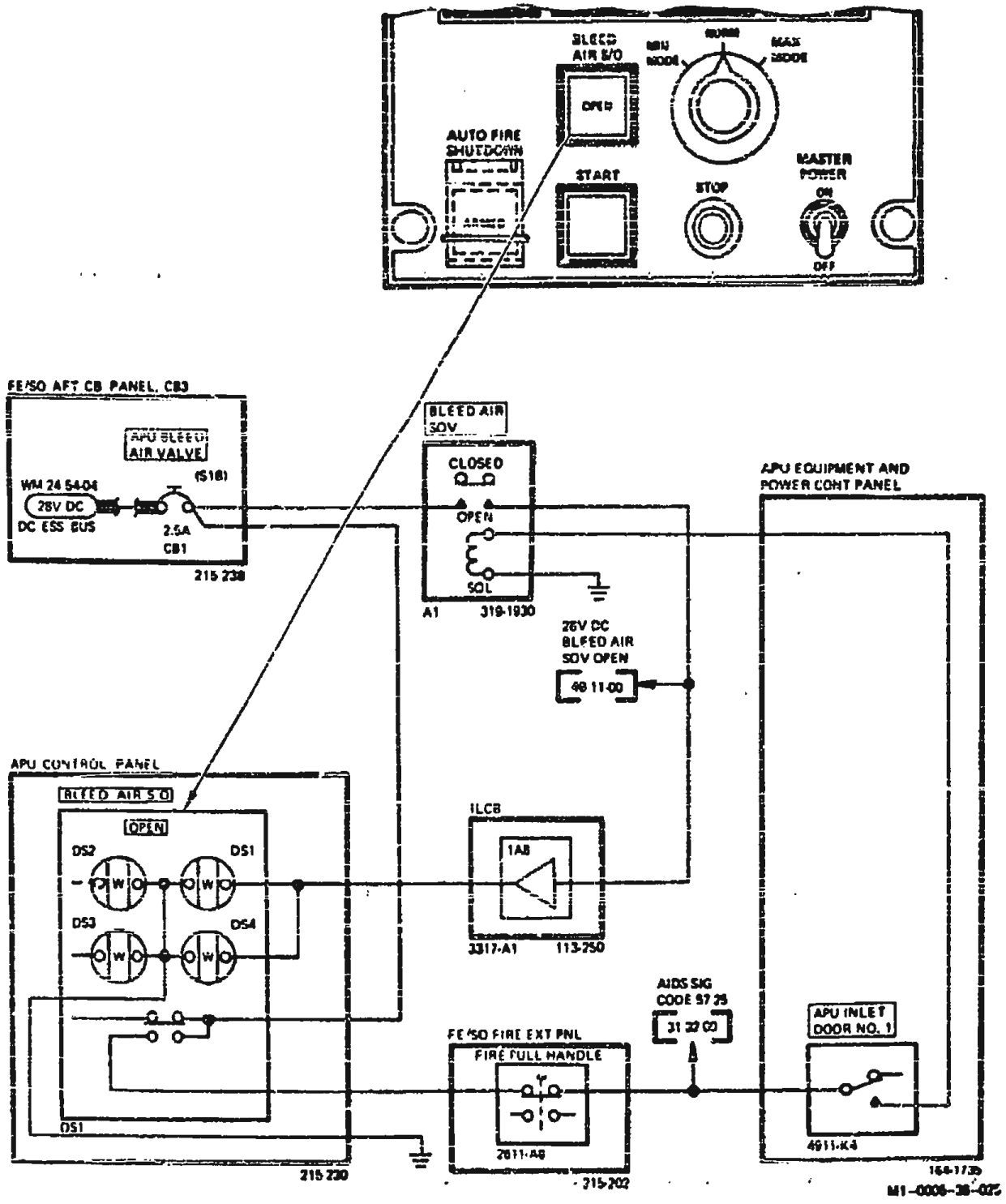
R The APU load compressor air system (bleed air) portion of the
R pneumatic distribution system (Ref. 36-10-00) consists only of
R the APU bleed air shutoff valve, its switchlight (BLEED AIR S/O) on the Flight Engineer/Second Officers upper panel APU CONTROL panel, zone 215, and the interconnecting wiring. These circuits include override control functions from the APU normal control circuits (Ref. 49-00-00) and the APU fire extinguishing system (Ref. 26-21-00).

R The function of this system is to admit or isolate flow of APU
R load compressor discharge air into the pneumatic distribution manifold system (Ref. 36-14-00). Since the load compressor is an integral part of the APU, and provides a control function in operation of the APU, operation and control of this unit is covered in Airborne Auxiliary Power (Ref. 49-00-00).

R The APU bleed air shutoff valve is a flange- and bracket-mounted, 8.0-inch-diameter, butterfly type valve. Selective open and close control is through an electric solenoid in the valve, and the valve is pneumatically actuated. It is installed in the lower left fuselage just aft of the aft pressure bulkhead (zone 317), immediately downstream of the APU load compressor discharge duct check valve (Ref. 49-51-00).

R When the APU is operating, opening and closing of the APU bleed
R air shutoff valve is normally controlled by the BLEED AIR S/O valve switchlight. When this switchlight is depressed (latched in) the valve control solenoid is energized and the valve opens to admit load compressor discharge air into the distribution manifold system if pneumatic pressure is available. When the valve is open, the OPEN legend in the switchlight is on. When the switchlight is released (out) the control solenoid is deenergized, the valve closes, and the legend in the switchlight goes out. In addition, the APU is driven to minimum discharge (Ref. 49-51-00).

R Override control circuits, to close the APU bleed air shutoff
R valve, are provided in the APU fire shutdown circuit (Ref. 26-21-00, Fire Extinguishing System). Override control is achieved when switch or relay contacts in that system open to
R interrupt power from the switchlight to the shutoff valve control solenoid (Ref. Fig. 1).



APU Bleed Air Shutoff Valve Simplified Schematic
Figure 1

2. APU Bleed Air Shutoff Valve

A. Description

The APU bleed air shutoff valve is a flange-and bracket-mounted, 8.0-inch-diameter, butterfly-type valve. Selective open and close control is through an electric solenoid in the valve, and the valve is pneumatically actuated (Ref. Fig. 2). This valve, and the aft fuselage duct isolation valve (Ref. 36-14-00) are identical and interchangeable.

The valve is installed in the duct going forward from the APU load compressor, in the lower left fuselage just aft of the aft pressure bulkhead (zone 317). The function of this valve is to isolate the APU load compressor (Ref. 49-51-00) from the pneumatic distribution manifold system (Ref. 36-14-00) as necessary. When the valve is open, air from the load compressor passes through a Y-duct shared with the No. 2 engine bleed air system (Ref. 36-11-00), and into the manifold.

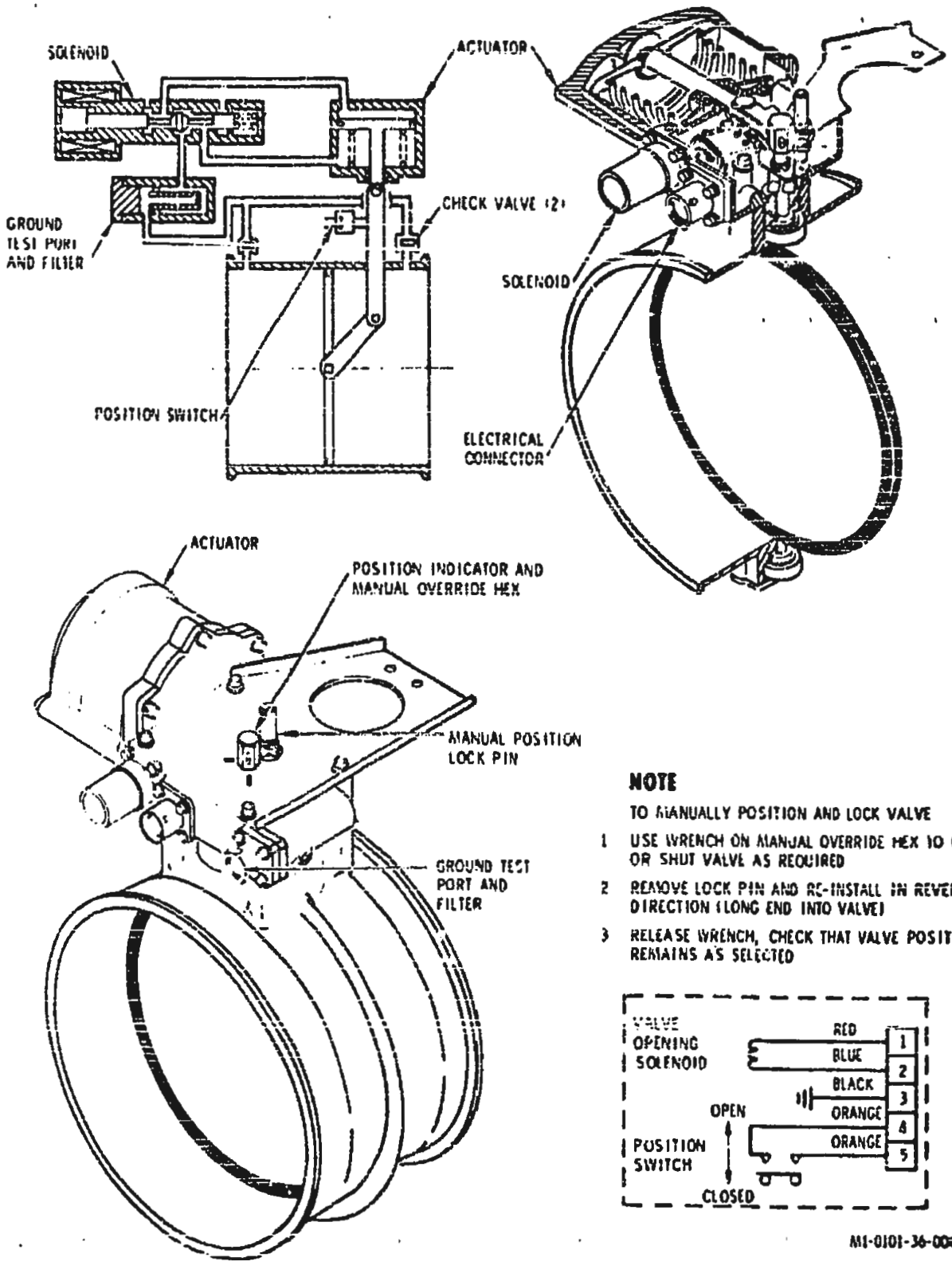
The pneumatic actuator on the valve is spring loaded to hold the valve butterfly in the closed position. Drilled ports in the valve bore, on each side of the valve butterfly, admit pneumatic pressure through two small check valves to a common chamber containing the filter. Access to the filter is through the ground check port that can be used, with ground checkout equipment, to check valve operational condition while it is installed.

From the filter chamber, pneumatic pressure goes to the control input port of the electric solenoid control valve. The two pressure ports and check valves allow pneumatic pressure from either side of the butterfly to be used to actuate the valve.

A manual override and position indicator lever, on the actuator end of the butterfly valve shaft, provides visual indication of valve position. A wrench hex on the shaft above the position indicator may be used to manually close the valve when necessary. A locking pin, carried in the valve housing, is then used to lock the valve closed.

B. Operation

When pneumatic pressure is not present at the valve, the valve butterfly is held closed by the spring loading on the lower side of the pneumatic actuator piston, and the valve will not open when the control solenoid is energized.



NOTE

TO MANUALLY POSITION AND LOCK VALVE

1 USE WRENCH ON MANUAL OVERRIDE HEX TO OPEN OR SHUT VALVE AS REQUIRED

2 REMOVE LOCK PIN AND RE-INSTALL IN REVERSE DIRECTION (LONG END INTO VALVE)

3 RELEASE WRENCH, CHECK THAT VALVE POSITION REMAINS AS SELECTED

M1-0101-36-004

APU Bleed Air Shutoff Valve
Figure 2

When pneumatic pressure is present, on either or both sides of the butterfly, and the electric solenoid is not energized, the solenoid control valve directs pressure to the lower (spring) side of the actuator piston and vents the upper side of the piston to ambient, providing positive valve closure.

When the electric solenoid is energized, and pneumatic pressure is present, the solenoid control valve directs pressure to the upper side of the actuator piston and vents the lower (spring) side of the piston to ambient. Air pressure above the piston overcomes spring force to fully open the valve when duct pressure is above 8.0 psi.

If the APU bleed air shutoff valve is failed in the open position when the APU is not operating, reverse air flow from the pneumatic system into the load compressor is prevented by the APU load compressor discharge check valve (Ref. 49-51-00).

APU BLEED AIR SHUTOFF VALVE MAINTENANCE PRACTICES

1. General

The APU bleed air shutoff valve is a butterfly-type valve used to isolate the APU load compressor from the pneumatic distribution manifold system. It is located in the duct forward of the APU load compressor, in the lower left fuselage just aft of the aft pressure bulkhead.

2. Maintenance Practices

A. Activation

R R R WARNING: FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) ENGINE BLEED CONTROL AND APU CONTROL PANELS MUST BE TAGGED FOR MANDATORY PERFORMANCE OF DEACTIVATION PROCEDURE FOR INOPERATIVE APU BLEED AIR SHUTOFF VALVE BEFORE FLIGHT.

(1) Open lower afterbody access panel 317DL (Ref. Fig. 201).

(2) Remove manual position lock pin (3/8-inch hex) from valve.

(3) Use 1/2-inch wrench on manual override hex and position indicator to open valve.

(4) When valve position indicator is at fully OPEN position install lock pin, long end first, and tighten.

(5) Use wrench on override hex to verify valve is locked in open position.

(6) Temporarily install access panel opened in Step 2A(1).

B. Deactivation

(1) Open lower afterbody access panel 317DL (Ref. Fig. 201).

(2) Remove manual position lock pin from valve.

(3) Use 1/2-inch wrench on manual override hex and position indicator to close valve.

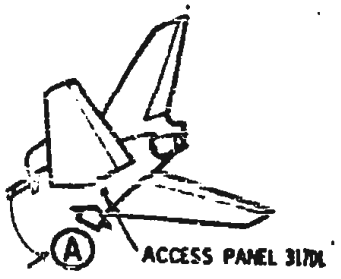
(4) When valve position indicator is at fully CLOSED position install lock pin, long end first, and tighten.

(5) Use wrench on override hex to verify valve is locked in closed position.

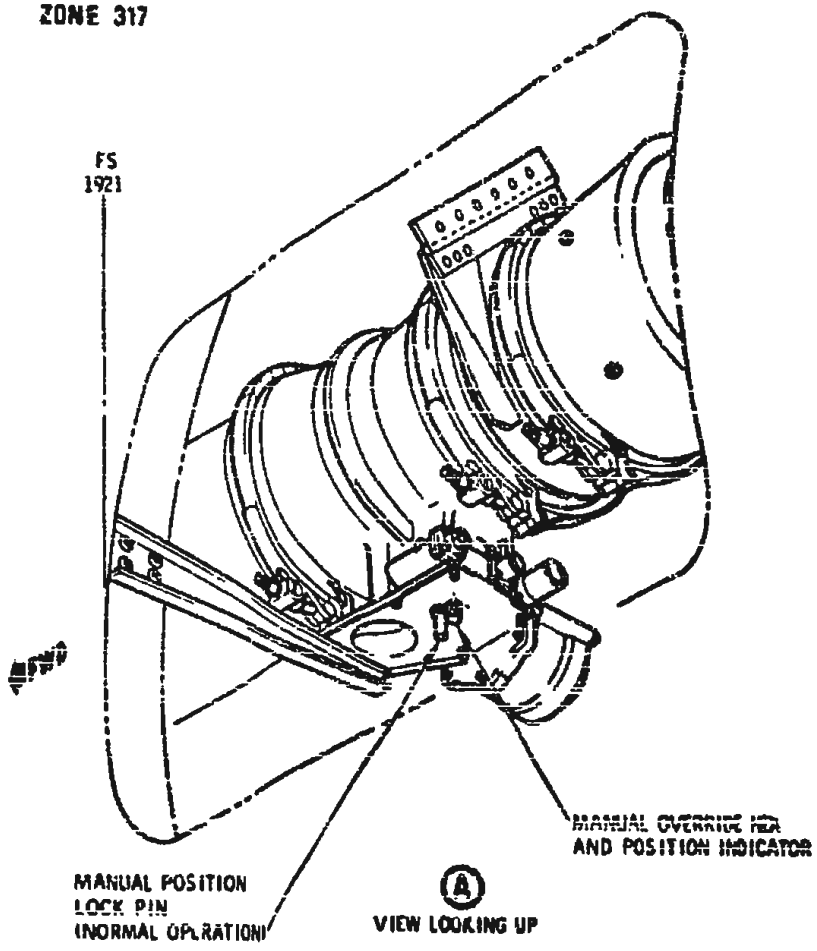
(6) Install access panel opened in Step 2B(1).

R (7) On FE/SO APU CONTROL panel, zone 215, placard BLEED AIR S/O switchlight APU BLEED AIR SHUTOFF VALVE INOPERATIVE.

(8) Make appropriate entry in aircraft log book.



ZONE 317



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APU Bleed Air Shutoff Valve
Figure 201

EFFECTIVITY: ALL

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APU BLEED AIR SHUTOFF VALVE REMOVAL AND INSTALLATION

1. General

The APU bleed air shutoff valve is a butterfly-type valve used to isolate the APU load compressor from the pneumatic
R distribution manifold system. The valve is located in the duct
R going forward from APU load compressor, in lower left fuselage just aft of the aft pressure bulkhead (zone 317).

This valve, and the aft fuselage duct isolation valve (Ref. 36-14-01) are identical and interchangeable.

2. Equipment and Material

A. Valve

Lockwire, Fed Spec QQ-W-390, 0.040-inch diameter or equivalent.

B. Air Filter

Filter-Parker Hannifin P/N 2691075

Preformed Packing - Parker Hannifin P/N 2661058R015

Grease - Dow Corning No. 33 or equivalent

Tool - Preformed Packing Applicator - Parker Hannifin P/N H80-0-114-3 or equivalent

Lockwire, Fed Spec QQ-W-390, 0.020-inch diameter or equivalent

3. Referenced Procedure

20-36-01 Single T-bolt V-band Coupling - Removal and Installation

4. Removal/Installation - APU Bleed Air Shutoff Valve

A. Removal

R (1) Placard Flight Engineer/Second Officers (FE/SO) bleed
R air and APU control panels and the three high-pressure

R ground air connections to prevent operation until
R completion of procedures.

R (2) On aircraft 001-031,
R on FE/SO aft circuit breaker panel CB3, zone 215, open
R and tag circuit breaker ESS BUS - APU BLEED AIR VALVE
R (S18).

R (2) On aircraft 032-999,
R on Pilots Overhead circuit breaker panel CB1, zone 214,
R open and tag circuit breaker STBY - APU BLEED AIR VALVE
R (H13).

R (3) Remove access panel 317DL on lower afterbody (Ref. Fig.
R 401).

R WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL
R REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH
R SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE
R USED WHEN REQUIRED.

R (4) Remove electrical connector.

R (5) Remove single T-bolt V-band couplings (Ref. 20-36-01)
R securing valve to duct.

R (6) Remove screws, washers, and nuts securing bracket to
R support on lower left hand frame.

R (7) Remove APU bleed air valve.

R (8) Install protective covers on ducts.

B. Installation

R (1) Verify that tags previously installed on FE/SO air and
R APU control panels and the three high-pressure ground
R air connections are in place.

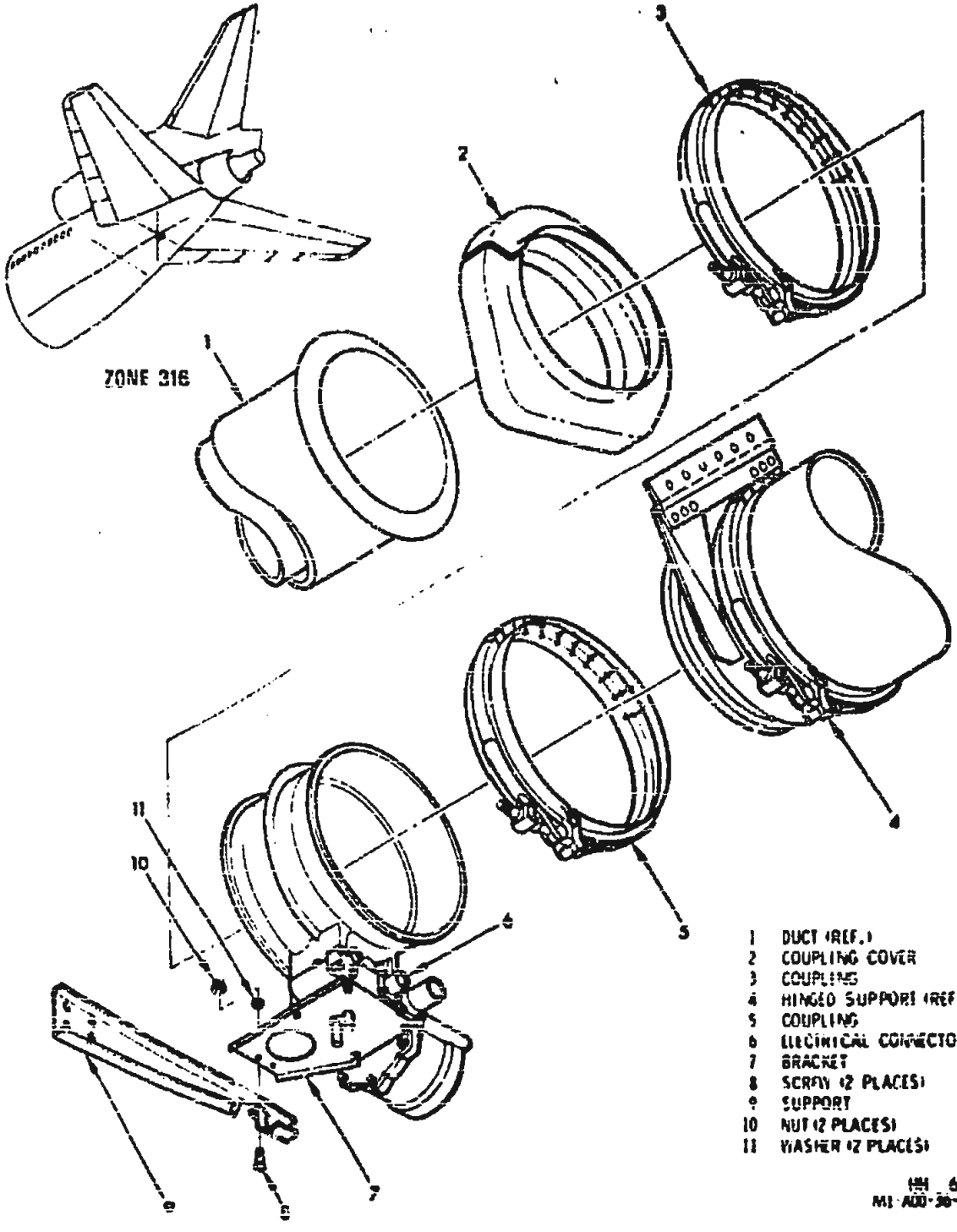
R (2) Verify that circuit breaker opened in Step 4A(2) is
R open and tagged.

R (3) Remove protective covers from ducts and inspect ducts
R for cleanliness and condition.

R (4) Secure valve to support with screws, washers, and nuts.

R (5) Align valve to ducts and install single T-bolt V-band
R couplings (Ref. 20-36-01).

R (6) Connect electrical connector.



R APU Bleed Air Valve - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

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R (7) Close access door.

R (8) Remove tag and close circuit breaker opened in Step
R 4A(2).

R (9) Remove placards installed in Step 4A(1).

5. Removal/Installation - Air Filter

A. Removal

R (1) Placard FE/SO bleed air and APU control panels and the
R three high-pressure ground air connections to prevent
R operation until completion of procedures.

R (2) On aircraft 001-031,
R on Flight Engineer/Second officers (FE/SO) aft circuit
R breaker panel CB3, zone 215, open and tag circuit
R breaker ESS BUS-APU BLEED AIR VALVE (S18).

R (2) On aircraft 032-999,
R on pilots overhead circuit breaker panel CB1, zone 214,
R open and tag circuit breaker STBY-APU BLEED AIR VALVE
R (H13).

R (3) Remove access panel 317DL on lower afterbody (Ref. Fig.
R 401).

R WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL
R REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH
R SYSTEM TEMPERATURE. PROTECTIVE GLOVES SHOULD BE
R USED WHEN REQUIRED.

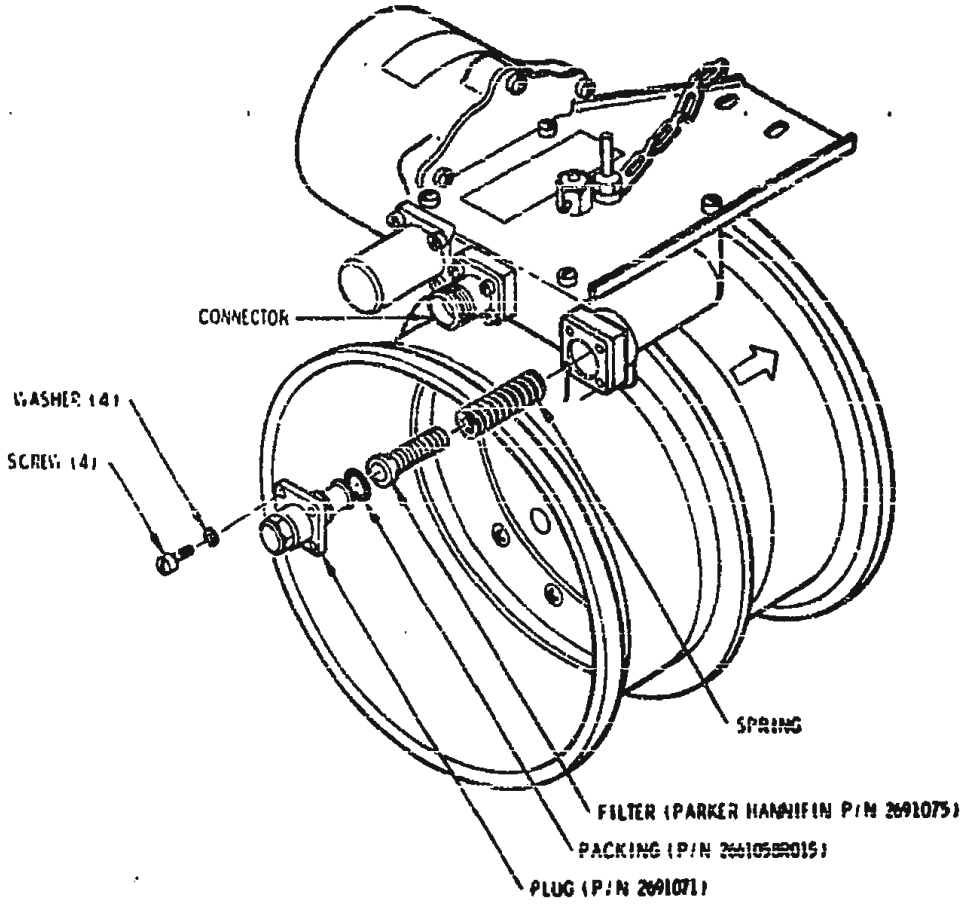
R (4) Remove lockwire between filter plug and connector.

R (5) Remove screws (4) and washers (4) from plug - Parker
R Hannifin P/N 2691071 (Ref. Fig 402). Remove spring and
R filter from housing. Separate packing from plug and
R discard packing.

B. Installation

R (1) Verify that tags previously installed on FE/SO bleed
R air and APU control panels and the three high-pressure
R ground air connections are in place.

R (2) Assemble packing (Parker Hannifin P/N 2661058R015) on
R plug (Parker Hannifin P/N 2691071) using preformed
R packing applicator.



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APU Bleed Air Shutoff Valve Air Filter
Removal and Installation
Figure 402

R (3) Install spring, filter and plug (Parker Hannifin P/N 2691071) with packing into filter housing (Ref. Fig 402).

R (4) Apply Dow Corning No. 33 grease to screws and washers and assemble through plug (Parker Hannifin P/N 2691071) into housing.

R (5) Lockwire plug with screws on connector

R (6) Install access panel removed in Step 5A(3).

R (7) Remove tag and close circuit breaker opened in Step 5A(2).

R (8) Remove placards installed in Step 5A(1).

APU BLEED AIR SHUTOFF VALVE ADJUSTMENT AND TEST

1. General

Field adjustment of the APU bleed air shutoff valve is not recommended.

2. Equipment and Materials

Valve Tester, Hamilton Standard GS9400-7, or equivalent

Test Plug, Hamilton Standard GS14123-1, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

O-ring (Ref. Fig. 501)

3. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
49-00-00	Auxiliary Power Unit - Maintenance Practices

4. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

R R (2) On aircraft 001-031, on Flight Engineer/Second Officers (FE/SO) aft circuit breaker panel CB3, zone 215, verify that circuit breaker ESS BUS - APU BLEED AIR VALVE (S18) is closed.

R (2) On aircraft 032-999, on pilots overhead circuit breaker panel CB1, zone 214, open and tag circuit breaker STBY - APU BLEED AIR VALVE (H13).

(3) Turn on auxiliary power unit (Ref. 49-00-00).

(4) On Flight Engineer/Second Officers APU CONTROL panel, zone 215, depress BLEED AIR S/O switchlight. Verify that OPEN legend is on.

(5) Release BLEED AIR S/O switchlight. Verify that OPEN legend is off.

(6) Turn off auxiliary power unit (Ref. 49-00-00).

(7) Return circuit breaker and switchlight to pretest positions.

B. Functional Test

WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF TEST PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Open access panel 317DL (Ref. Fig. 501).

(2) Remove ground test plug and install test plug.

(3) Connect test plug to valve tester. Verify that pressure is not applied to test port.

(4) Turn on electrical power (Ref. 24-41-00).

R (5) On aircraft 001-031,
R on Flight Engineer/Second Officer (FE/SO) aft circuit breaker panel CB3, zone 215, verify that circuit breaker ESS BUS - APU BLEED AIR VALVE (S18) is closed.

R (5) On aircraft 032-999,
on pilots overhead circuit breaker panel CB1, zone 214, verify that circuit breaker STBY - APU BLEED AIR VALVE (H13) is closed.

(6) On Flight Engineer/Second Officers APU CONTROL panel, zone 215, release BLEED AIR S/O switchlight. Verify that valve is closed (position indicator points to SHUT and switchlight OPEN legend is off).

(7) Apply 7 psig to test port. Verify that valve remains closed.

(8) On APU CONTROL panel, depress (latch in) BLEED AIR S/O switchlight. Verify that valve opens (position indicator points to OPEN and switchlight OPEN legend is on).

(9) Remove pressure from test port. Verify that valve closes.

(10) Reapply 7 psig to test port. Verify that valve opens.

(11) On APU CONTROL panel, release BLEED AIR S/O switchlight. Verify that valve closes.

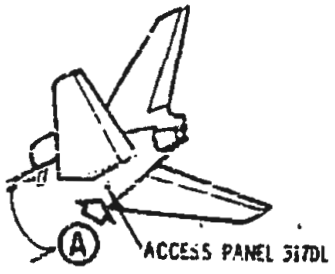
(12) Remove pressure from test port.

(13) Remove test plug and reinstall ground test plug with new O-ring.

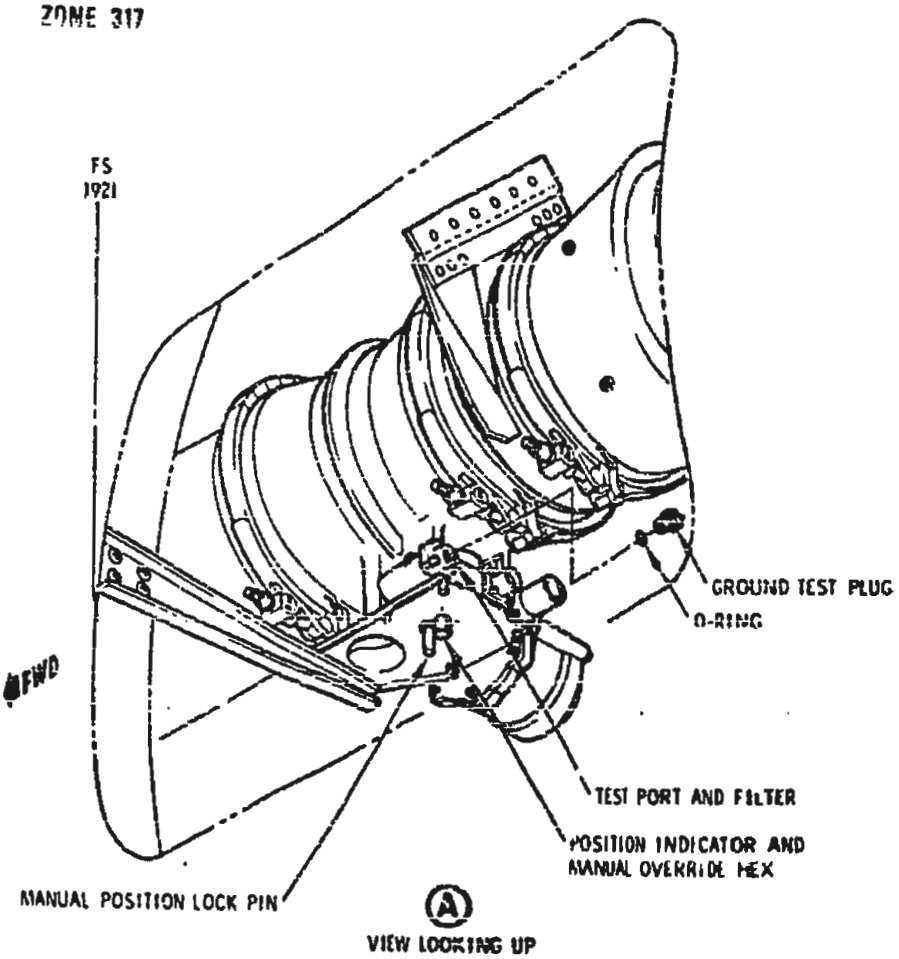
(14) Tighten plug and secure with lock-wire.

(15) Close access 317DL panel.

(16) Remove tags installed at beginning of Paragraph 4B.



ZONE 317



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APU Bleed Air Shutoff Valve
Figure 501

EFFECTIVITY: ALL

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APU BLEED AIR SHUTOFF VALVE INSPECTION AND CHECK

1. General

R Units with excessive or unrepairable damage should be replaced and sent to overhaul.

2. Referenced Procedure

36-12-02 APU Bleed Air Shutoff Valve - Cleaning and Painting

3. Inspection/Check

A. Inspection

(1) Inspect electrical connector for broken pins or other damage.

(2) Inspect inlet and outlet flanges for nicks, dents, or other damage.

(3) Loosen filter nut and remove filter seal. Discard seal.

(4) Inspect filter for clogged or dirty pores.

(5) If required, clean dirty or clogged filter (Ref. 36-12-02, Cleaning and Painting).

(6) Install new seal on filter.

(7) Install filter and secure with nut.

R

APU BLEED AIR SHUTOFF VALVE CLEANING AND PAINTING

1. Equipment and Materials

Soft-bristle brush

Petroleum Solvent, Spec AMS3160B, or equivalent

Lint-free cloth

2. Referenced Procedure

R 36-12-02 APU Bleed Air Shutoff Valve - Inspection and Check

3. Cleaning/Painting

A. Cleaning

WARNING: USE PETROLEUM SOLVENTS ONLY IN A WELL-VENTILATED AREA AND WITH PROPER PRECAUTIONS TO PREVENT FIRE. WEAR GOGGLES WHEN USING COMPRESSED AIR TO DRY PARTS.

CAUTION: USE COMPRESSED AIR CAREFULLY ON FINE-MESH FILTER SCREEN TO PREVENT DAMAGE.

(1) Clean dirty or clogged filter (Ref. 36-12-02, Inspection and Check) with solvent. Use a soft-bristle brush or immerse and agitate filter in solvent.

(2) Clean all exterior surfaces of valve with a lint-free cloth dampened in solvent.

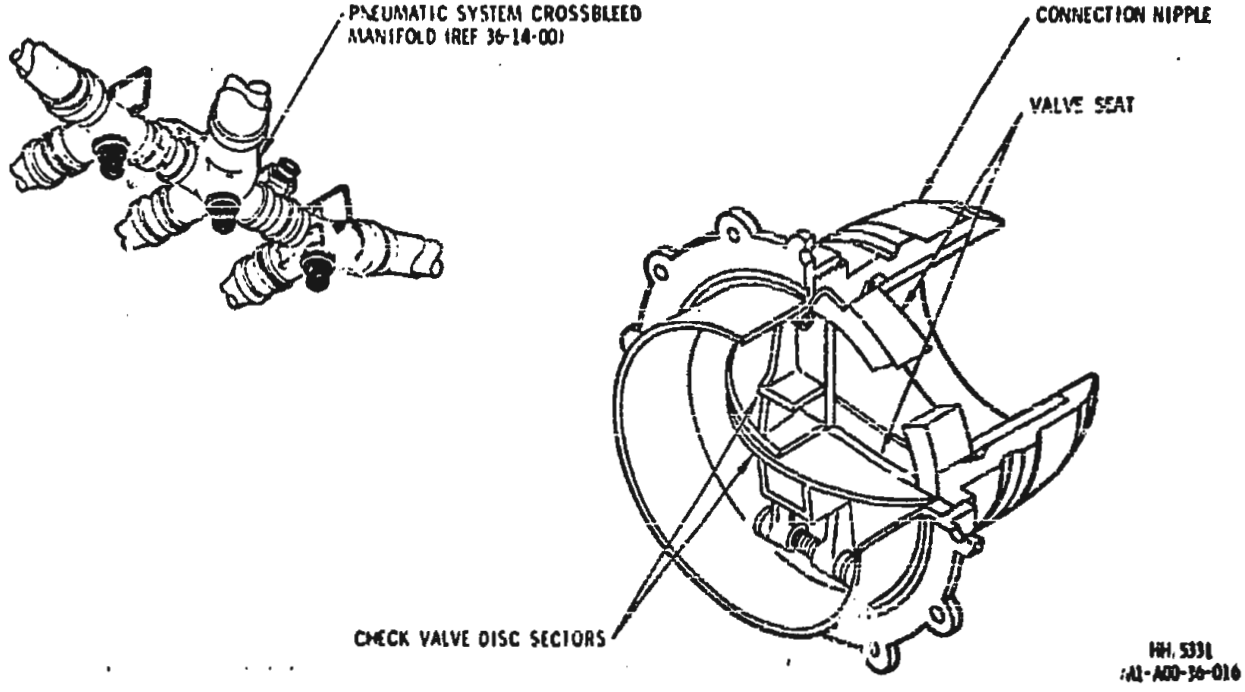
(3) Dry unit with dry, filtered, compressed air.

HIGH-PRESSURE GROUND AIR SYSTEM - DESCRIPTION AND OPERATION

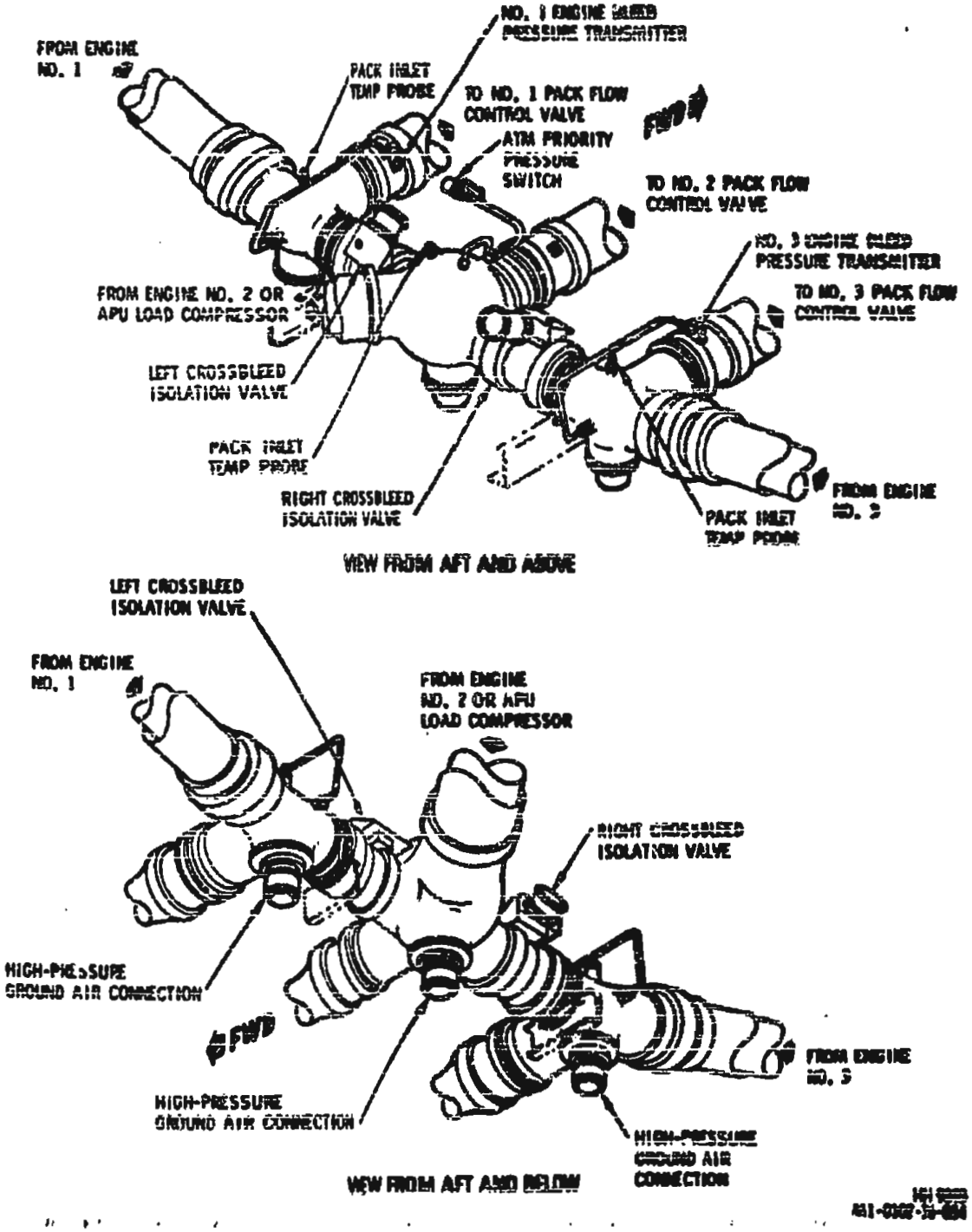
1. General

The high-pressure ground air system consists of three identical 3-inch-diameter ground air connections with integral check valves (Ref. Fig. 1). The connections attach directly to the bottom of the crossbleed manifold (Ref. Fig. 2). Access to the connections is provided through three small rectangular hinged doors under the forward portion of the wing center section, zone 142.

The nipple at the bottom of each connection mates with the standard (MS 33740) quick attach-detach air hose connector. The check valve is a two-sector disc-type valve. Each half-disc sector is hinged at the outer edge and spring-loaded to close. Disc sector movement is limited to maintain pressure on the sector to prevent flutter.



High-pressure Ground Air Connection
Figure 1


FROM ENGINE NO. 1
PACK INLET TEMP PROBE
NO. 1 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 1 PACK FLOW CONTROL VALVE
FWD
ATM PRIORITY PRESSURE SWITCH
TO NO. 2 PACK FLOW CONTROL VALVE
NO. 3 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
LEFT CROSSBLEED ISOLATION VALVE
PACK INLET TEMP PROBE
RIGHT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 3
PACK INLET TEMP PROBE
VIEW FROM AFT AND ABOVE
LEFT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 1
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
RIGHT CROSSBLEED ISOLATION VALVE
HIGH-PRESSURE GROUND AIR CONNECTION
FWD
FROM ENGINE NO. 3
HIGH-PRESSURE GROUND AIR CONNECTION
HIGH-PRESSURE GROUND AIR CONNECTION
VIEW FROM AFT AND BELOW

Crossbleed Manifold
Figure 2

2. Operation

R WARNING: PRIOR TO USING A HIGH PRESSURE GROUND AIR CONNECTOR, ENSURE THAT THE INTERNAL CHECK VALVE FLAPS HAVE FREE AND ADEQUATE MOVEMENT. IF ONE OR MORE FLAPS STICK IN THE OPEN POSITION, MOVE FLAP(S) TO THE SHUT POSITION AND IF POSSIBLE USE AN ALTERNATE CONNECTOR.

R Connect high pressure ground air to engine No. 2 ground air connection located forward of the wing center section. Verify that APU BLEED AIR S/O switchlight does not indicate OPEN.

Three ground air connections are provided to assure sufficient flow capacity to operate systems using this pressure source. Supply air pressure and temperature limits are 65 psia and 500 degrees F, respectively. The air is used by the following systems: air conditioning (Ref. 21-00-00), hydraulic power (Ref. 29-11-00), and engine cranking (Ref. 80-11-00). This air may also be used for partial ground check of the wing anti-ice system (Ref. 30-13-00). The operation of control valves to direct ground air flow to these systems is covered in the Distribution Manifold System (Ref. 36-14-00).

Maximum supply air flow requirements occur during operation of the air conditioning system. When all three air cycle packs are in use, all three ground air connections are needed. Flow requirements are from 390 lbs/min at 40 psia and 350 degrees F to 450 lbs/min at 65 psia and 500 degrees F, depending upon ambient temperature.

Simultaneous operation of the two air turbine motor-driven pumps in the hydraulic power system is available. Three ground air connections are needed at this time. Flow requirements are from 300 lbs/min at 65 psia and 500 degrees F to 340 lbs/min at 35 psia and 350 degrees F.

Two ground air connections are needed during engine cranking. Flow requirements are from 175 lbs/min at 42 psia and 350 degrees F to 230 lbs/min at 61 psia and 500 degrees F, depending upon ambient temperature.

R WARNING: AVOID DIRECT CONTACT WITH ANY HOT AIR LEAKAGE WHEN DISCONNECTING THE HIGH PRESSURE GROUND AIR SUPPLY FROM THE AIRCRAFT.

R Hot air leakage can be minimized by physically closing the affected check valve flap(s) using a locally manufactured rigid wire hook. After removing the high pressure ground air from the aircraft, remove any wire hook that was used to close the check valve flap.

HIGH-PRESSURE GROUND AIR CONNECTION - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the three ground air connections except for access door references.

2. Removal/Installation

R WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH PRESSURE GROUND AIR CONNECTORS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

A. Removal

(1) Open access door 142AB for right side ground air connection, 142BB for center connection or 142CB for left side connection (Ref. Fig. 401).

(2) Remove access panel 1420B.

(3) Remove bolts, washers, and nuts securing ground air connection to crossbleed manifold.

(4) Remove ground air connection and O-ring seal.

(5) If replacement ground air connection is not immediately available, install protective cover over manifold port.

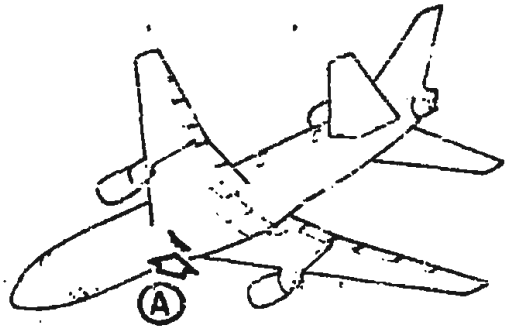
B. Installation

R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO
R BLEED AIR AND APU CONTROL PANELS AND THE THREE
R HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

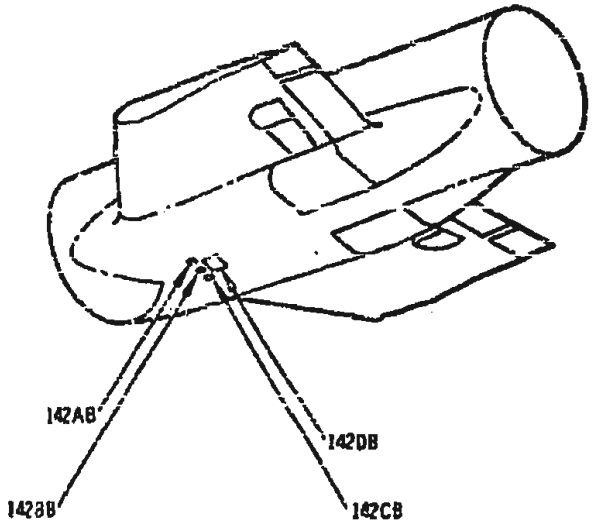
(1) Remove protective cover over manifold port if installed, and inspect mounting surfaces for cleanliness and condition.

(2) Place O-ring seal over ground air connection nipple.

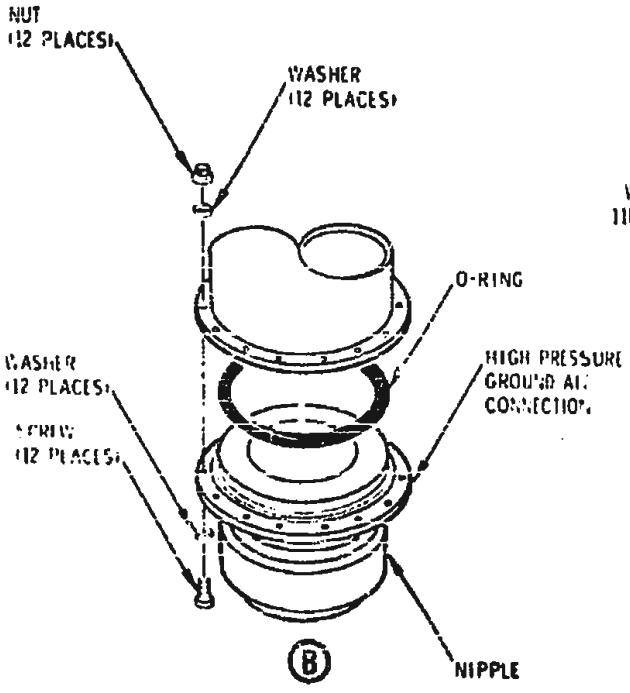
(3) Install ground air connection into manifold port and secure with bolts, washers, and nuts.

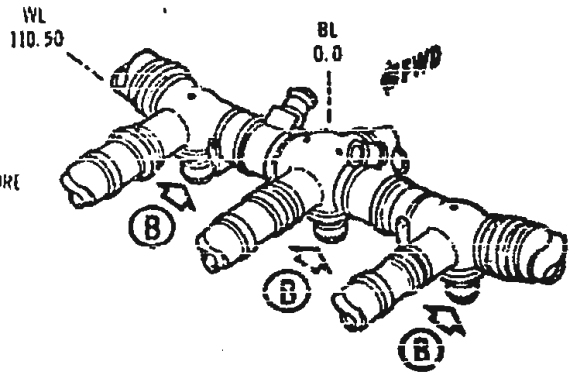


ZONE 142



ACCESS DOORS AND PANEL





IPI 6010
MI-400-36-061

High-pressure Ground Air Connection - Removal and Installation
Figure 401

(4) Close applicable access door.

(5) Install access panel.

(6) Remove placards installed in Step 2.

DISTRIBUTION MANIFOLD SYSTEM - DESCRIPTION AND OPERATION

1. General

The distribution manifold system portion of the pneumatic distribution system (Ref. 36-10-00) includes all components and ducting used to connect the sources of pneumatic pressure to the systems that will use that high-pressure air (Ref. Fig. 1, 2, 3, 4, and 5).

The distribution manifold system begins at those points where air leaves each of the pressure sources listed below.

The engine bleed air system (Ref. 36-11-00) delivers air to the distribution manifold through the three engine isolation and overpressure shutoff valves, one near each engine.

The APU load compressor system (Ref. 36-12-00) delivers air to the manifold through the APU duct isolation valve, aft of the aft pressure bulkhead.

The high-pressure ground air system (Ref. 36-13-00) delivers air from a ground source (or sources) to the distribution manifold through the three high-pressure ground air connections, under the forward portion of the wing center section.

Major components within the distribution manifold system include three duct isolation valves that enable division of the distribution manifold into isolated sections, and four duct compensators that maintain tension on the distribution manifold system ducting by compensating for changes in duct length due to temperature changes (Ref. Fig. 1).

The aft fuselage duct isolation valve is in the aft, lower left corner of the hydraulic service center, zone 147 (Ref. Fig. 2). The valve enables isolation of fuselage ducting, bleed air sources, and using systems on either side of this valve from the balance of the pneumatic system (Ref. Fig. 1).

The left and right crossbleed duct isolation valves are in the fuselage crossbleed duct, below the forward beam of the wing center section, zone 142 (Ref. Fig. 2 and 5). In addition to the isolation function these valves enable crossbleed control for routing air between pressure sources and using systems other than those normally served (Ref. Fig. 1).

R The aft fuselage duct compensator is in the left cheek area
R outboard of the aft cargo compartment, zone 163 (Ref. Fig. 3 and 10). The self-telescoping duct compensator maintains tension

upon the ducting between the junction of the engine No. 2 bleed air and APU load compressor discharge ducts and the pressure bulkhead aft of the left main wheel well. The mid-fuselage duct compensator is in the area below the left side of the wing center section, forward of the hydraulic service center, zone
R 143 (Ref. Fig. 3 and 10) . The compensator maintains tension upon the ducting between the aft end of the hydraulic service center, inboard of the left main wheel well, and the crossbleed manifold duct under the forward beam of the wing center section.

The left and right wing duct compensators are in the inboard wing leading edges, zones 510 and 610, and maintain tension upon
R the ducting between the fuselage and the two wing engine pylons
R (Ref. Fig. 3 and 11).

The distribution manifold system ends at the valves that control the using systems listed below.

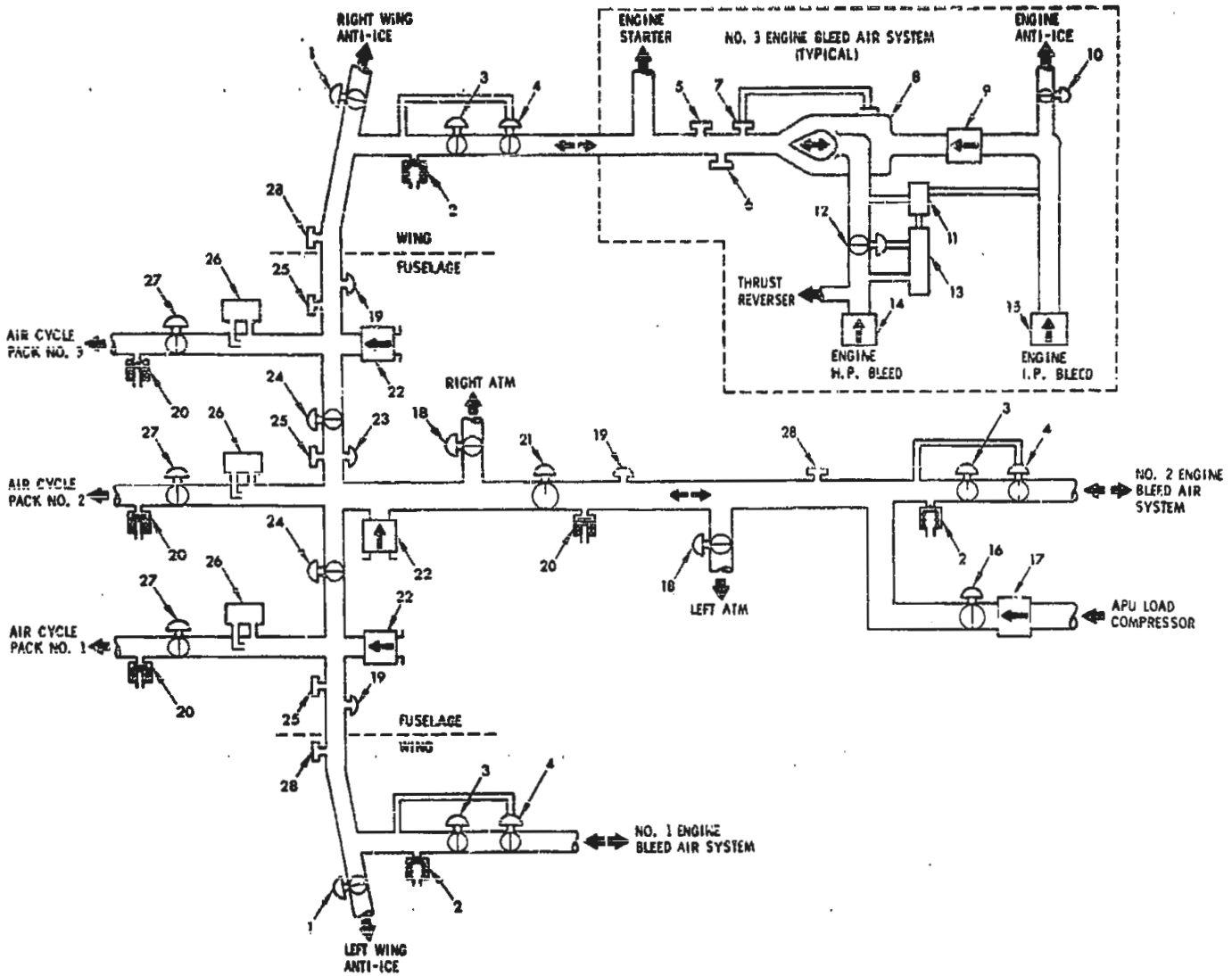
The air conditioning system (Ref. 21-00-00) takes air from the fuselage cross bleed portion of the distribution manifold under the forward beam of the wing center section through the three air cycle pack flow control valves (Ref. 21-21-00).

The wing anti-ice system (Ref. 30-13-00) takes air from the distribution manifold near the leading edges inboard of each wing engine isolation through the left and right wing anti-ice control valves.

The hydraulic power system (Ref. 29-11-00) takes air from the distribution manifold near the hydraulic service center to drive two air turbine motor (ATM) driven hydraulic pumps through the left and right ATM control valves.

Ducting support bracketing throughout the distribution manifold system incorporates hinges that allow longitudinal movement of the ducting (Ref. Fig. 4). This allows the duct compensators to maintain uniform tension in the ducting between fixed duct or component support points. Duct-to-duct and duct-to-component connections use single T-bolt V-band couplings (Ref. Fig. 3 and Fig. 5 Sheet 2). Duct end flanges and component mounting flanges are formed to provide an air tight seal without the use of gaskets or other sealing methods between the flanges.

Duct and component insulation is preformed impregnated fiberglass sections with integral standoff provisions, using the air gap principle for insulation. Maximum temperature, on the outside of the insulation, is below 200 degrees.



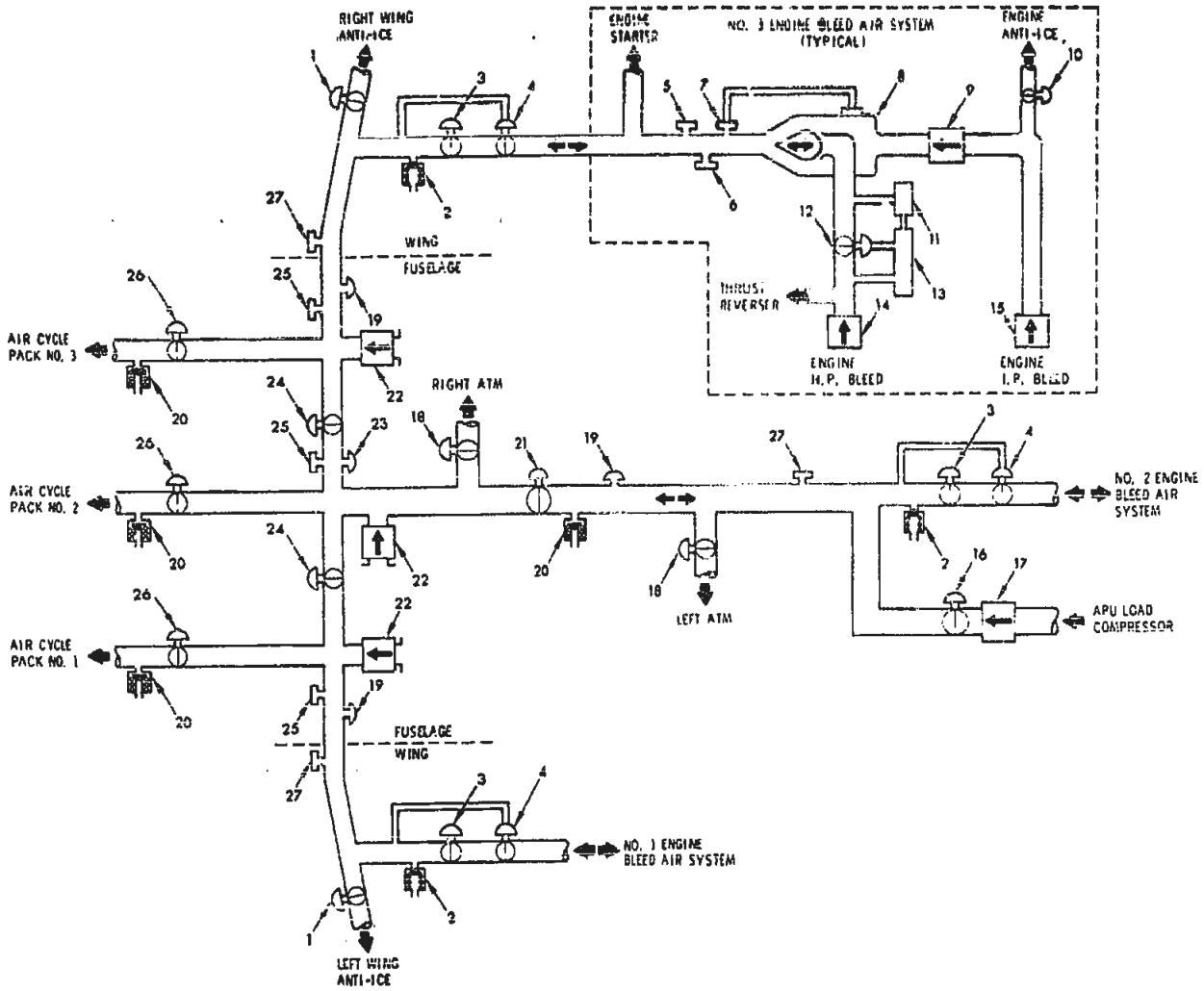
1 ANTI-ICE REGULATING/SHUTOFF VALVE (30-13-00)
2 OVERPRESSURE RELIEF VALVE (36-11-00)
3 OVERPRESSURE SHUTOFF VALVE (36-11-00)
4 ENGINE ISOLATION VALVE (36-11-00)
5 TEMPERATURE SEQUENCE SWITCH (36-11-00)
6 OVERTEMPERATURE SWITCH (36-11-00)
7 MIXING EJECTOR TEMPERATURE SENSOR (36-11-00)
8 MIXING EJECTOR (36-11-00)
9 I. P. ANTI-ICE CHECK VALVE (36-11-00)
10 ANTI-ICE REGULATING/SHUTOFF VALVE (30-21-00)
11 HIGH-PRESSURE VALVE CONTROLLER (36-11-00)
12 HIGH-PRESSURE VALVE (36-11-00)
13 HIGH-PRESSURE OVERPRESSURE SWITCH (36-11-00)
14 HIGH-PRESSURE CHECK VALVE (75-00-00)
15 INTERMEDIATE PRESSURE CHECK VALVE (75-00-00)
16 APU DISCHARGE DUCT ISOLATION VALVE (36-12-00)
17 APU DISCHARGE CHECK VALVE (49-51-00)
18 ATM CONTROL VALVE (29-11-00)
19 PRESSURE TRANSMITTER (36-21-00)
20 CONDENSATE DRAIN VALVE (36-14-00)
21 AFT FUSELAGE DUCT ISOLATION VALVE (36-14-00)
22 HIGH PRESSURE GROUND AIR CONNECTION AND CHECK VALVE (36-13-00)
23 ATM PRIORITY PRESSURE SENSOR (21-21-00)
24 CROSSBLEED DUCT ISOLATION VALVE (36-14-00)
25 PACK INLET TEMPERATURE SENSOR (21-63-00)
26 AIR DIFFERENTIAL PRESSURE SWITCH (36-14-00)
27 PACK FLOW CONTROL VALVE (21-21-00)
28 AIDS TEMPERATURE SENSOR (36-11-00)

M1-0004-36-111

Distribution Manifold System Schematic
Figure 1

EFFECTIVITY: 001-033

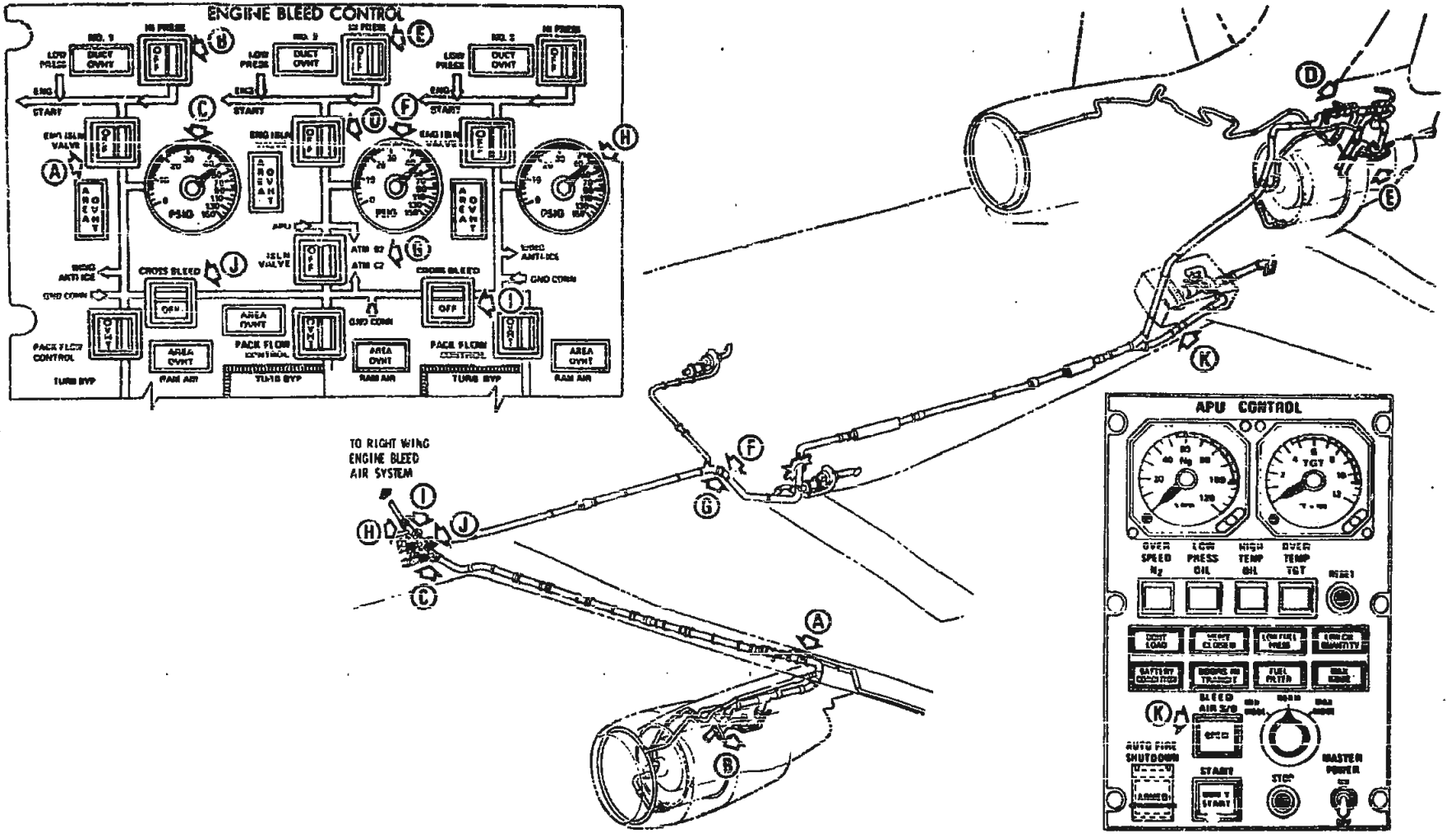
001B



1 ANTI-ICE REGULATING/SHUTOFF VALVE (30-13-00)
2 OVERPRESSURE RELIEF VALVE (36-11-00)
3 OVERPRESSURE SHUTOFF VALVE (36-11-00)
4 ENGINE ISOLATION VALVE (36-11-00)
5 TEMPERATURE SEQUENCE SWITCH (36-11-00)
6 OVERTEMPERATURE SWITCH (36-11-00)
7 MIXING EJECTOR TEMPERATURE SENSOR (36-11-00)
8 MIXING EJECTOR (36-11-00)
9 I.P. ANTI-ICE CHECK VALVE (36-11-00)
10 ANTI-ICE REGULATING/SHUTOFF VALVE (30-21-00)
11 HIGH-PRESSURE VALVE CONTROLLER (36-11-00)
12 HIGH-PRESSURE VALVE (36-11-00)
13 HIGH-PRESSURE OVERPRESSURE SWITCH (36-11-00)
14 HIGH-PRESSURE CHECK VALVE (75-00-00)
15 INTERMEDIATE PRESSURE CHECK VALVE (75-00-00)
16 APU DISCHARGE DUCT ISOLATION VALVE (36-12-00)
17 APU DISCHARGE CHECK VALVE (49-51-00)
18 ATM CONTROL VALVE (29-11-00)
19 PRESSURE TRANSMITTER (36-21-00)
20 CONDENSATE DRAIN VALVE (36-14-00)
21 ATT FUSELAGE DUCT ISOLATION VALVE (36-14-00)
22 HIGH PRESSURE GROUND AIR CONNECTION AND CHECK VALVE (36-13-00)
23 ATM PRIORITY PRESSURE SENSOR (21-21-00)
24 CROSSBLEED DUCT ISOLATION VALVE (36-14-00)
25 PACK INLET TEMPERATURE SENSOR (21-53-00)
26 PACK FLOW CONTROL VALVE (21-21-00)
27 AIDS TEMPERATURE SENSOR (36-11-00)

M1-0000-36-386

Distribution Manifold System Schematic
Figure 1



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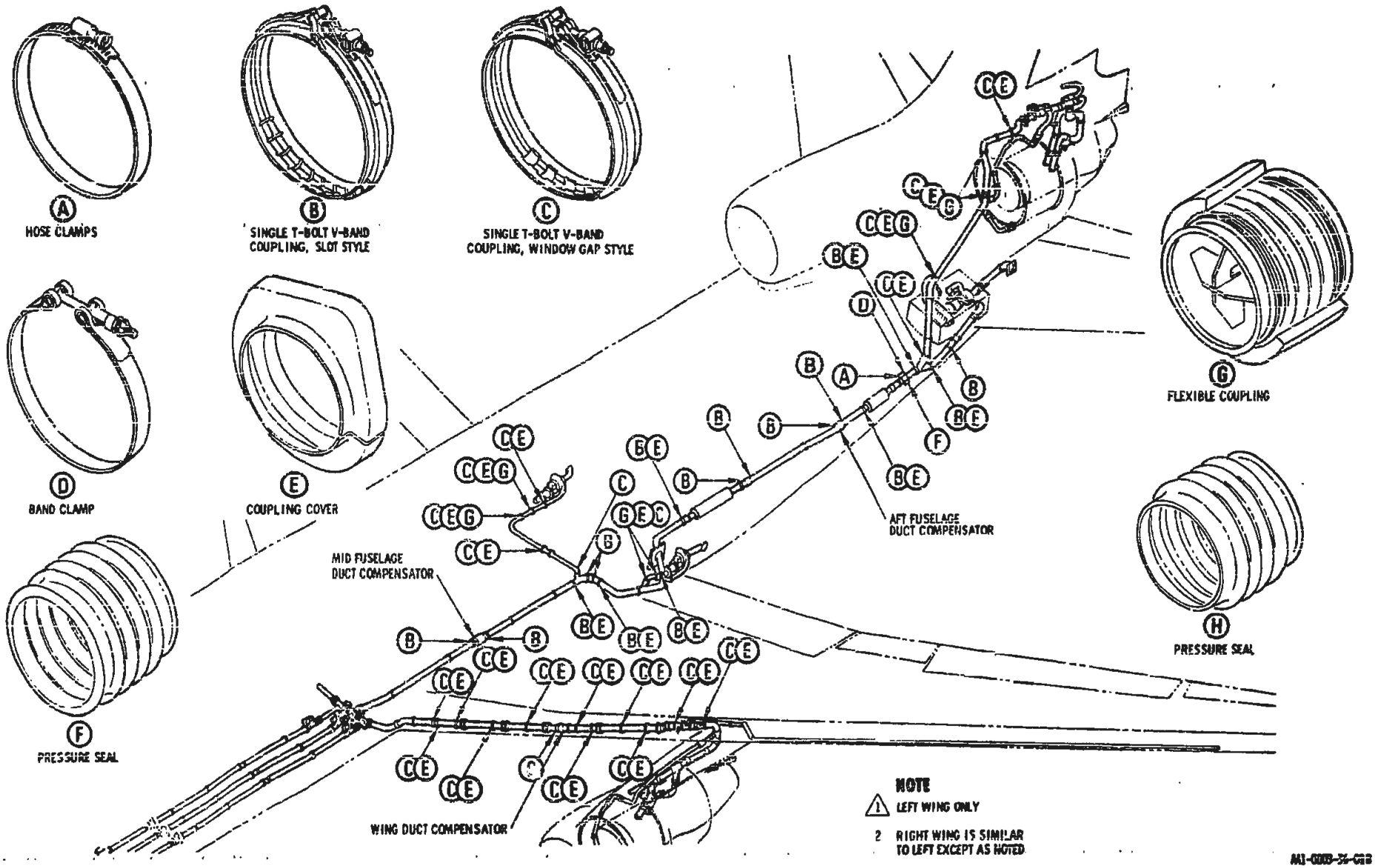
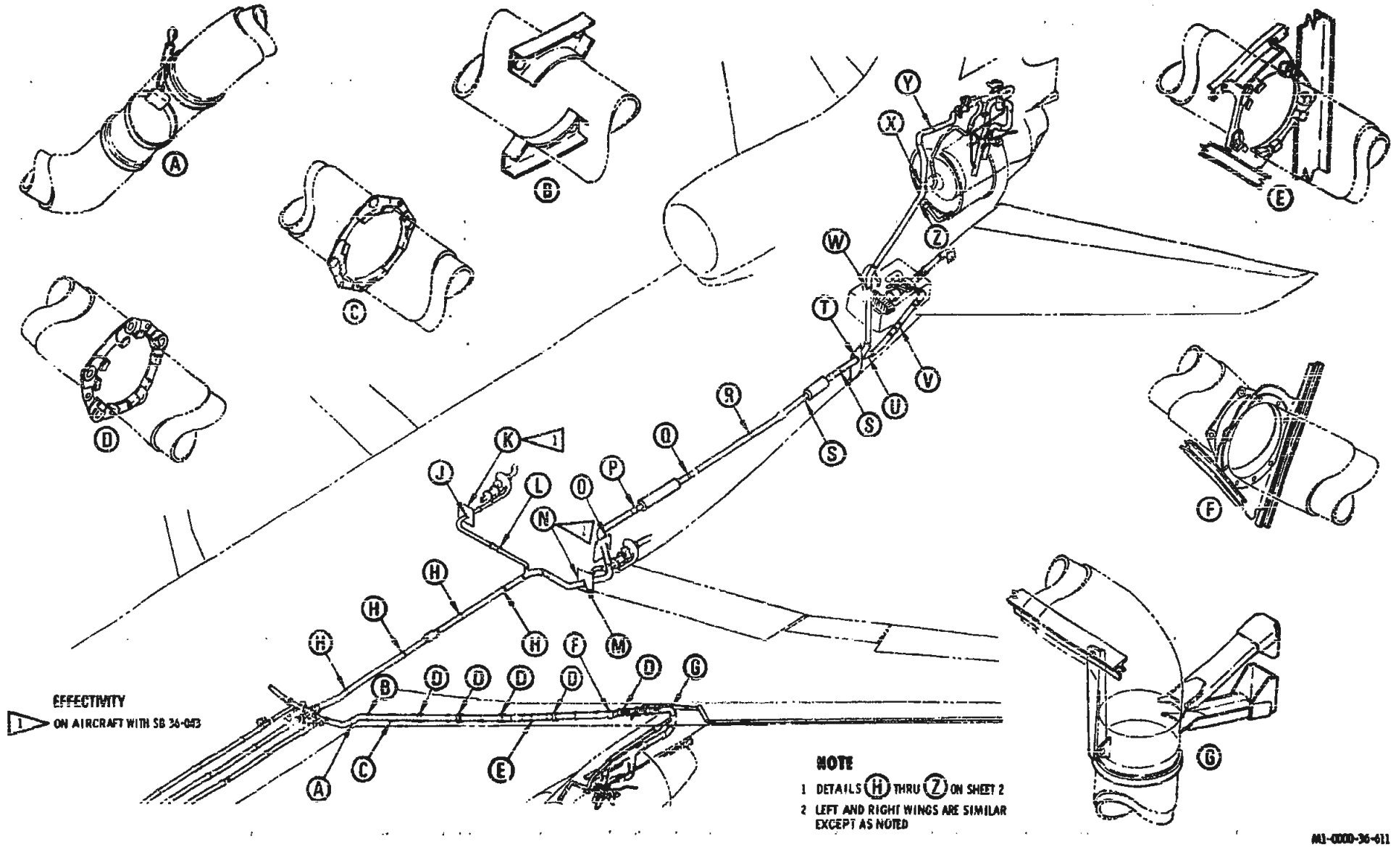
Distribution Manifold System Valve Locations
Figure 2



Distribution Manifold System Clamps and Couplings
Figure 3



Distribution Manifold System Ducting Supports
Figure 4 (Sheet 1)

R
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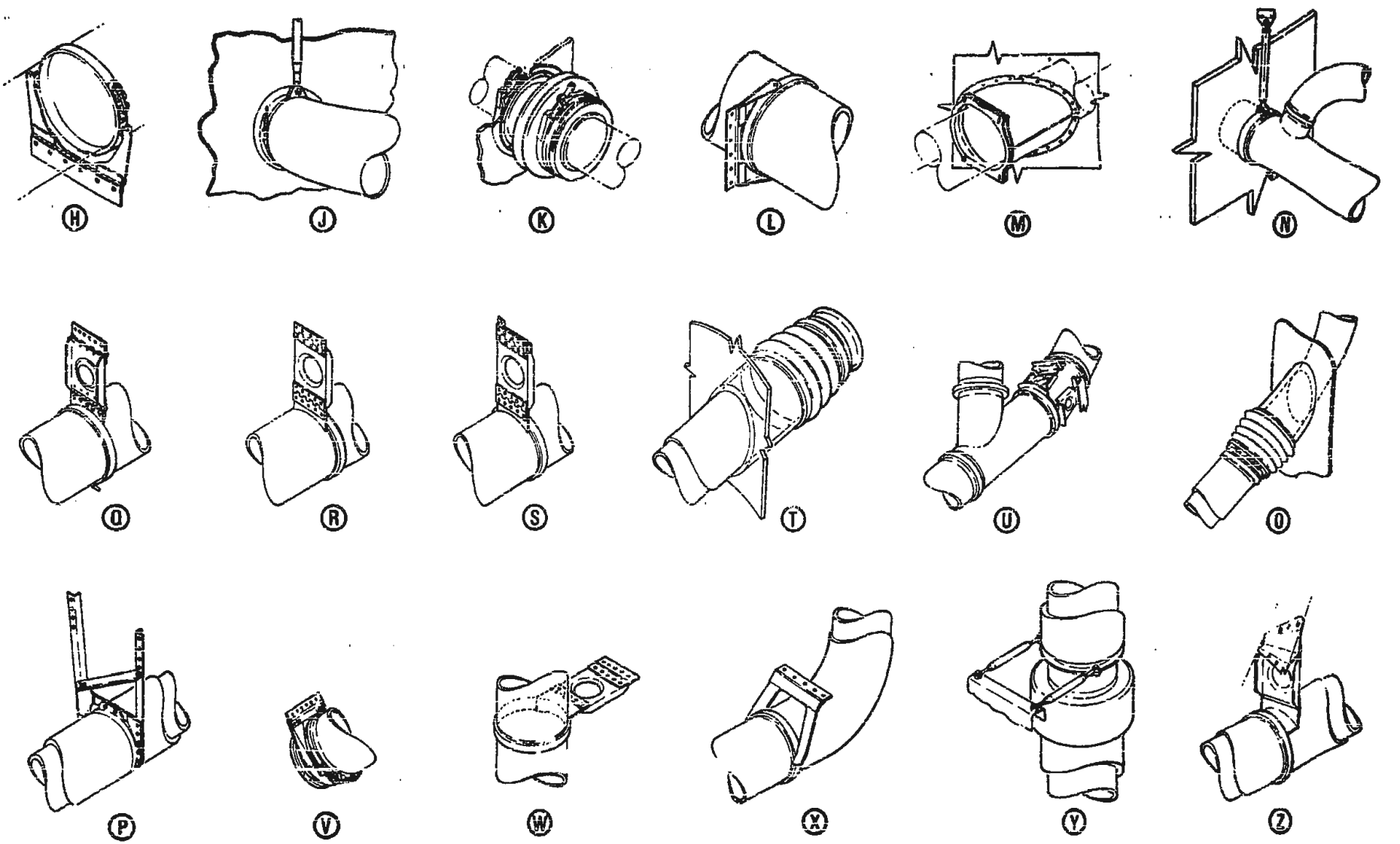
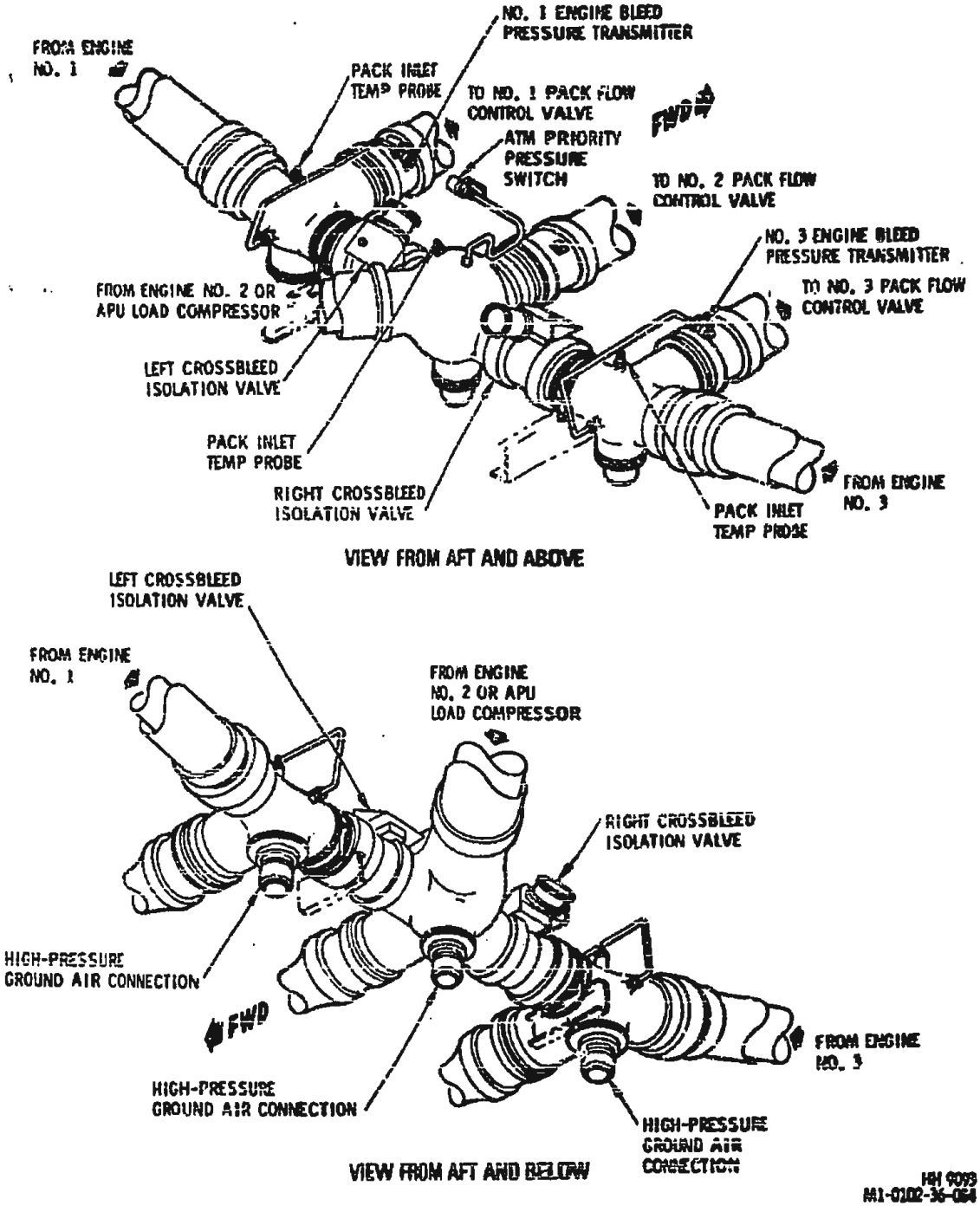
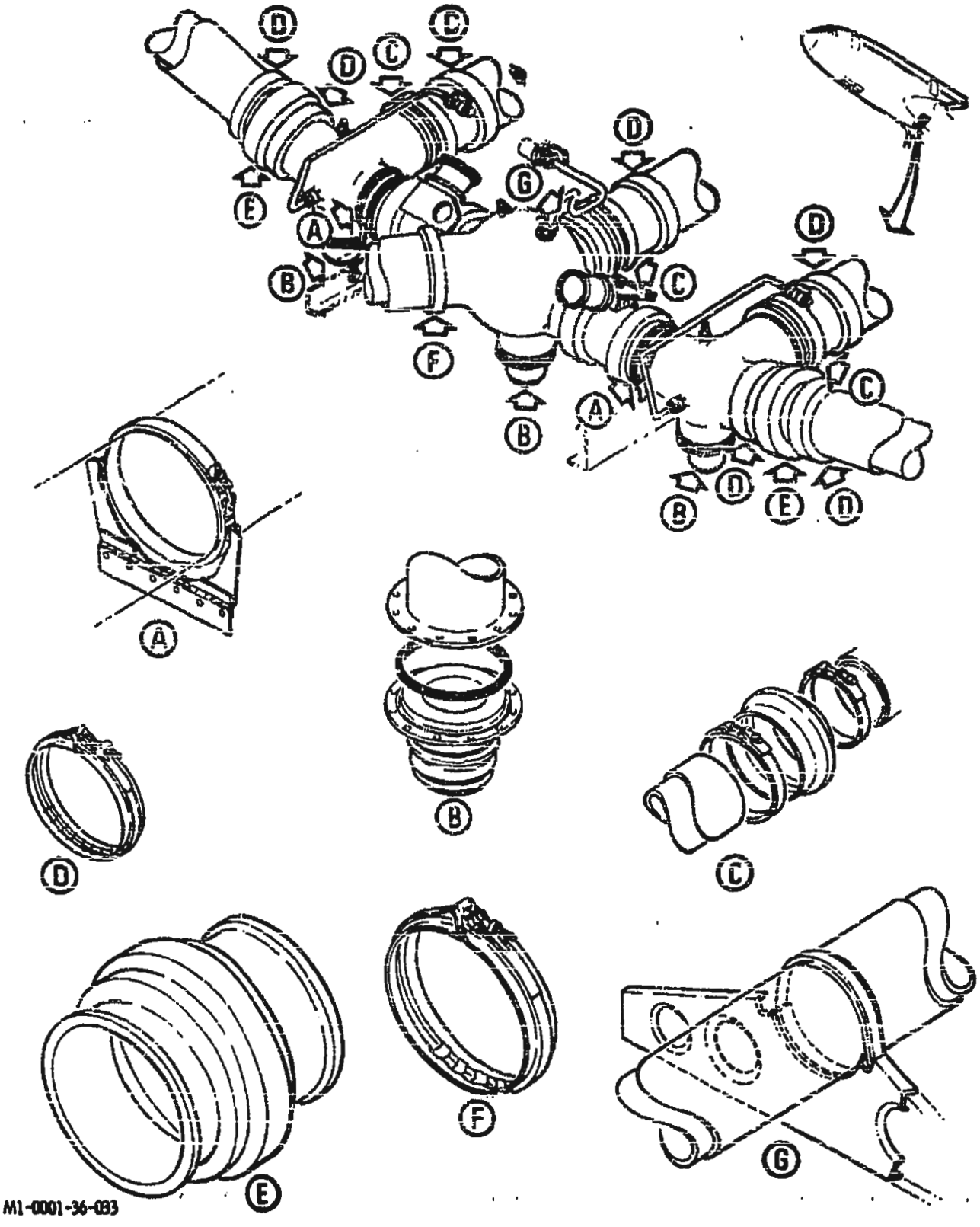
001B EFFECTIVITY: ALL



Distribution Manifold System Ducting Supports
Figure 4 (Sheet 2)


FROM ENGINE NO. 1
PACK INLET TEMP PROBE
NO. 1 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 1 PACK FLOW CONTROL VALVE
FWD
ATM PRIORITY PRESSURE SWITCH
TO NO. 2 PACK FLOW CONTROL VALVE
NO. 3 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
LEFT CROSSBLEED ISOLATION VALVE
PACK INLET TEMP PROBE
RIGHT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 3
PACK INLET TEMP PROBE
VIEW FROM AFT AND ABOVE
LEFT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 1
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
RIGHT CROSSBLEED ISOLATION VALVE
HIGH-PRESSURE GROUND AIR CONNECTION
FWD
FROM ENGINE NO. 3
HIGH-PRESSURE GROUND AIR CONNECTION
HIGH-PRESSURE GROUND AIR CONNECTION
VIEW FROM AFT AND BELOW
HM 9093
M1-0102-36-084

Crossbleed Manifold
Figure 5 (Sheet 1)



Crossbleed Manifold
Figure 5 (Sheet 2)

2. Operation

Operational procedures for the pneumatic distribution manifold system are dependent upon the source or sources of pneumatic pressure available. The following operational description is based on the assumption that the various pressure sources have been brought into operation as detailed in the description and operation section for each source: engine bleed air system, 36-11-00; APU load compressor system, 36-12-00; and high-pressure ground air system, 36-13-00.

The three duct isolation valves in the distribution manifold system provide control of the air distribution from any pressure source or sources to any using system or systems (Ref. Fig. 1). Opening and closing control of the isolation valves is through the aft fuselage ISLN VALVE and the left and right CROSS BLEED switchlights on the Flight Engineer/Second Officers upper panel, zone 215, ENGINE BLEED CONTROL panel. Circuit operation for the control of all three valves is the same (Ref. Fig. 6 and 7).

When one of these switchlights is depressed, that valve control solenoid is energized and, if pneumatic pressure is available on either side of the valve, the valve opens and the flowbar in the switchlight comes on. When the switchlight is released, the OFF legend comes on and the valve control solenoid is deenergized. When the valve closes, the flowbar goes out. The following is a description of distribution manifold configurations for the various conditions of system use (Ref. Fig. 1 and 2).

A. On Ground Operation

(1) High-pressure Ground Air Source

With a high-pressure ground air source (or sources) connected and in operation (one, two or three ground air connections in use), both the left and right CROSS BLEED switchlights would be depressed to open these valves to make all incoming air available to all using systems. To start engine No. 2, the aft fuselage ISLN VALVE switchlight must be depressed to open that valve and make pressure available at that engine.

(2) Auxiliary Power Unit (APU)

With the APU in operation, the aft fuselage ISLN VALVE and the left and right CROSS BLEED switchlights would be depressed to open all the valves and make APU load compressor discharge air available to all using systems.

(3) Engine Bleed Air

When all three engines are operating, the left and right CROSS BLEED switchlights and the aft fuselage ISLN VALVE switchlight would be depressed opening the valves to admit bleed air from all engines into the manifold.

B. Takeoff/Landing Operation

During takeoff or landing the aft fuselage ISLN VALVE and the left and right CROSS BLEED valves are normally left open to interconnect all bleed ducts. Priority for the Air Turbine Motor is provided by a pressure switch that limits air conditioning system use of bleed air when available air pressure is below 12 psi (Ref. 21-21-00, Air Conditioning Distribution System).

C. Inflight Operation

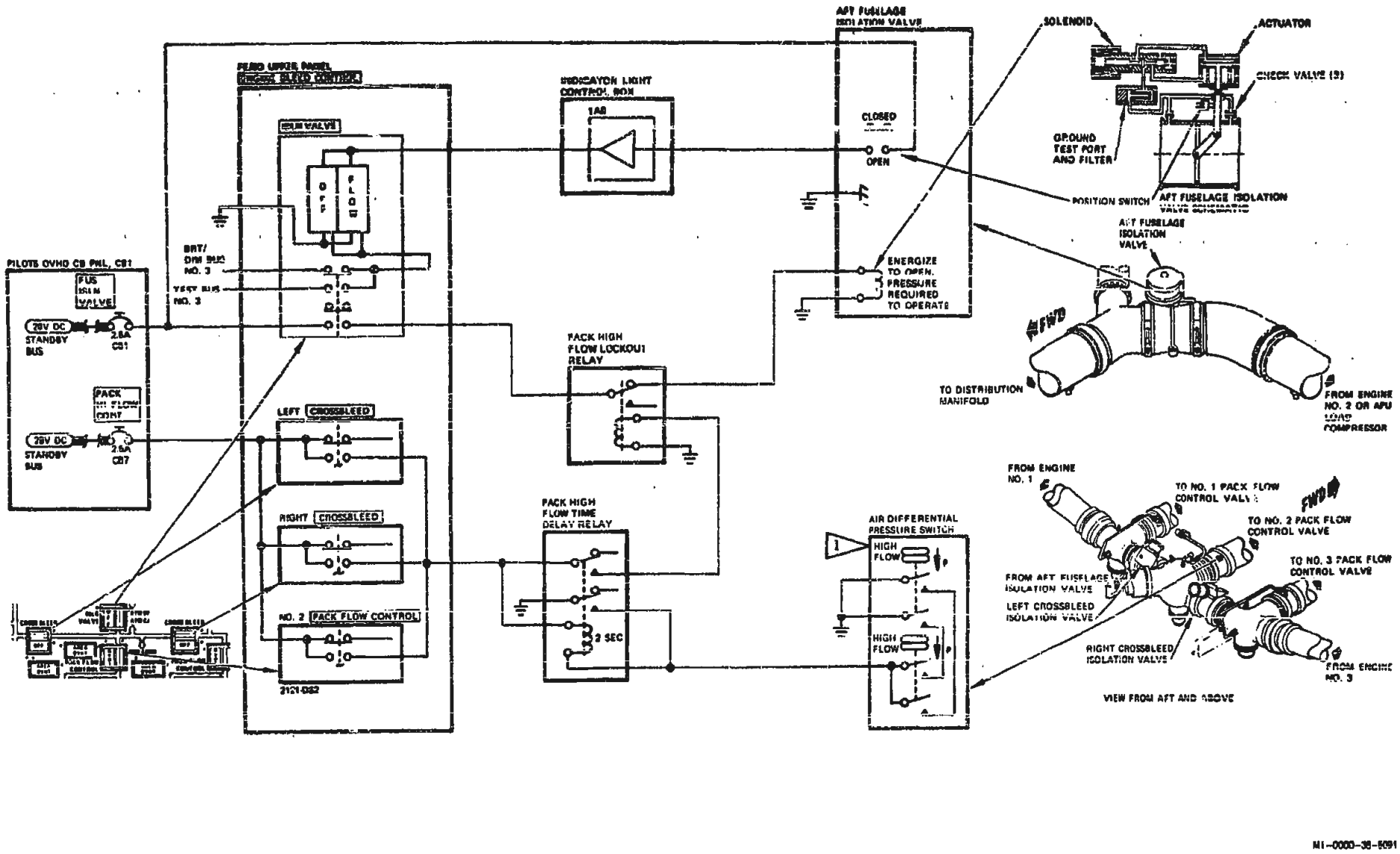
Normal inflight operation includes the use of all three engine bleed air systems to operate all using systems. The distribution manifold system configuration would be with the aft fuselage ISLN VALVE switchlight depressed and the left and right CROSS BLEED switchlights depressed to open all valves.

The crossbleed duct isolation valves provide options for cross-usage of engine bleed air sources versus air cycle packs (Ref. 21-51-00) other than the normal condition. If an air cycle pack becomes inoperative, use of bleed air from the corresponding engine may be discontinued or the crossbleed valves may be opened to permit three engine bleed systems to operate the remaining two air cycle packs. Choice of method would be dependent upon engine operating conditions.

In event of reduced bleed air supply, such as could occur with an engine malfunction, use of the corresponding air cycle pack would normally be discontinued. If a combination of air cycle pack malfunction and reduced bleed air supply occurred, the cross bleed isolation valves can be positioned to provide routing of available bleed air to the operational air cycle packs.

D. Pack High Flow Lockout

R On aircraft 001-033 without SB21-214, each of the three bleed ducts just forward of the crossbleed manifold contains an excess flow sensor to detect duct air velocity. A duct rupture below the MESC floor downstream of the excess flow sensors will be detected as excessive duct air velocity. The flow sensor parallel contacts close to furnish ground to energize the pack high-flow time-delay



Aft Fuselage Duct Isolation Valve Simplified Schematic
Figure 6

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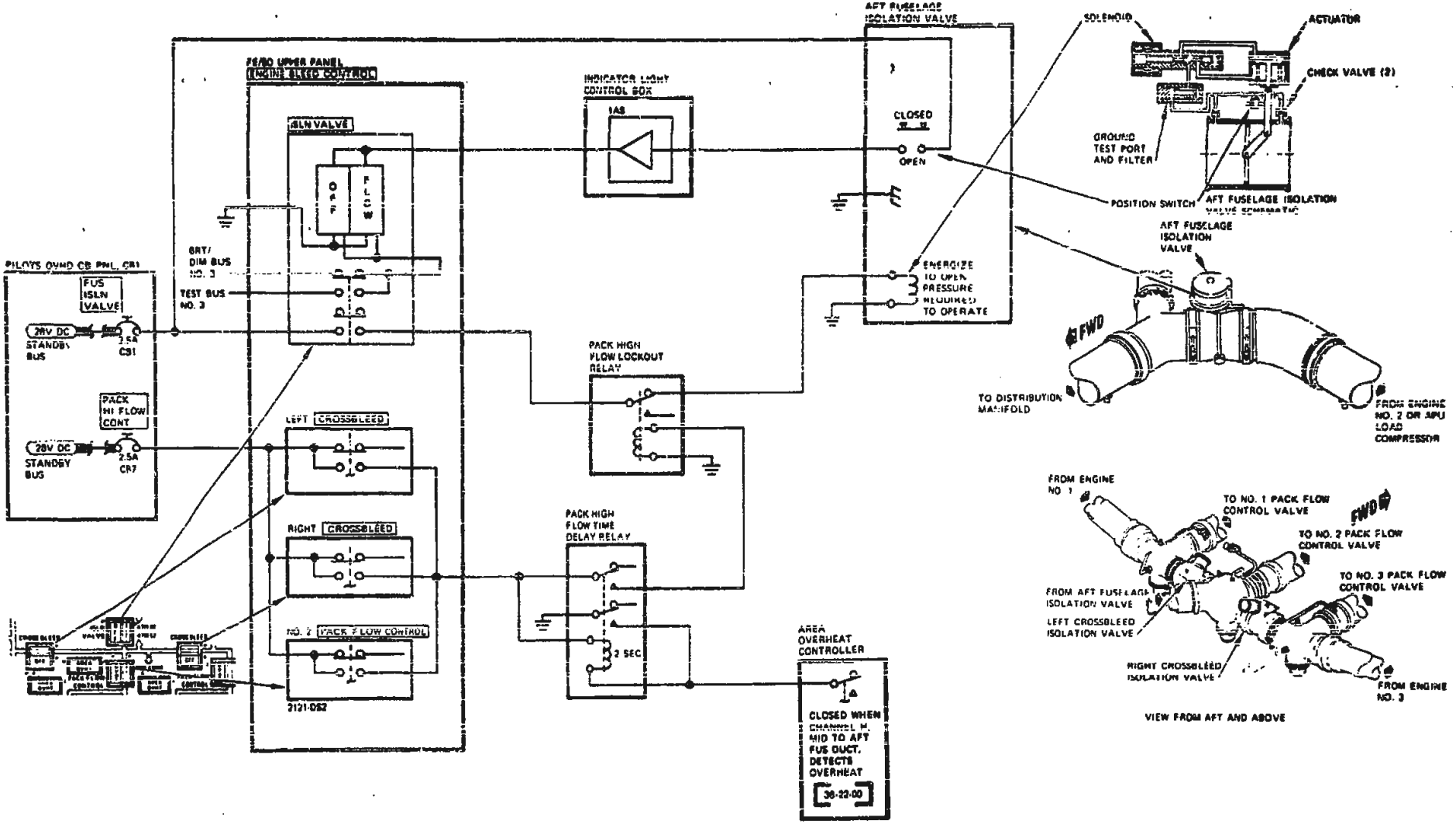
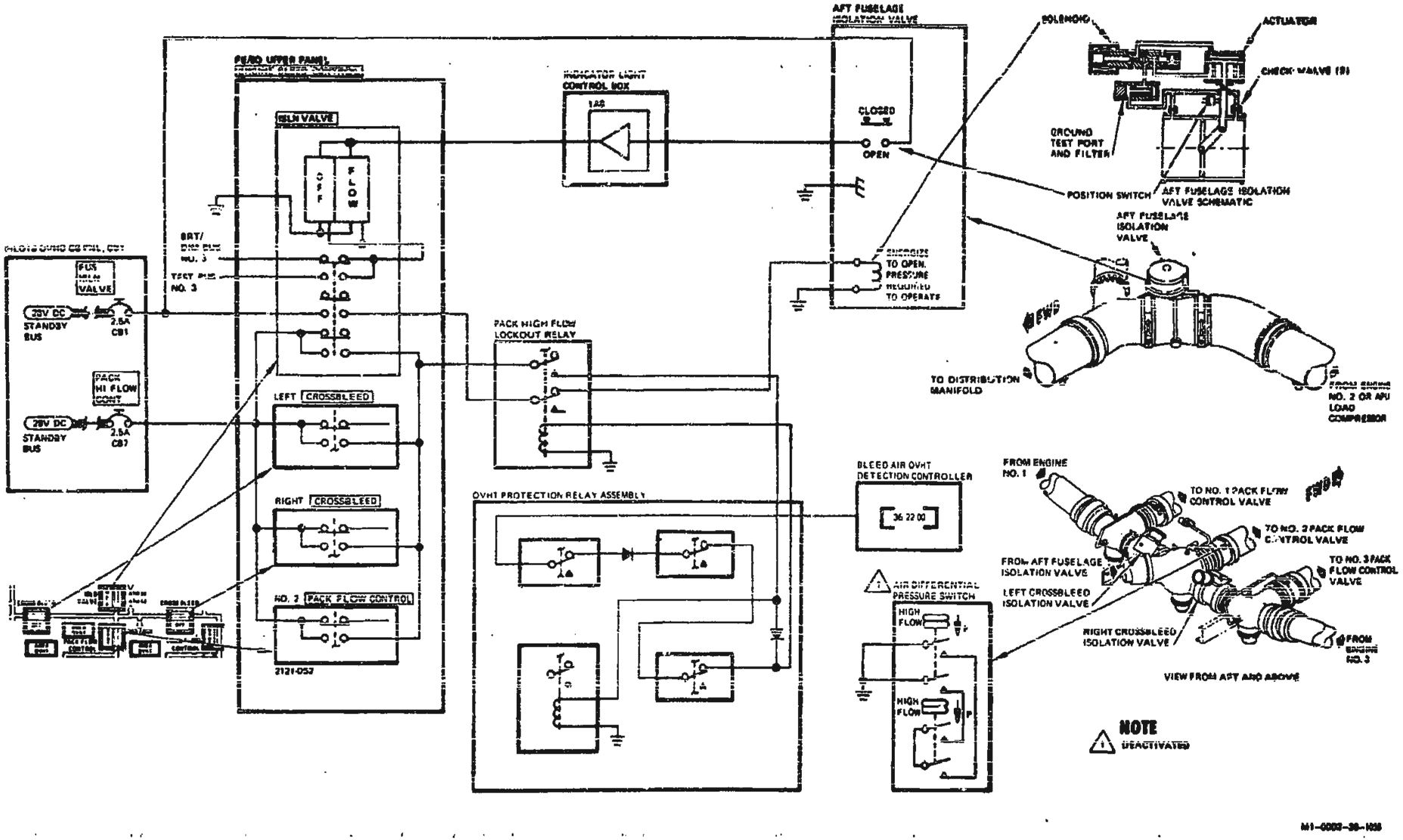
001B EFFECTIVITY: 001-033 WITHOUT SB21-214



Aft Fuselage Duct Isolation Valve Simplified Schematic
Figure 6

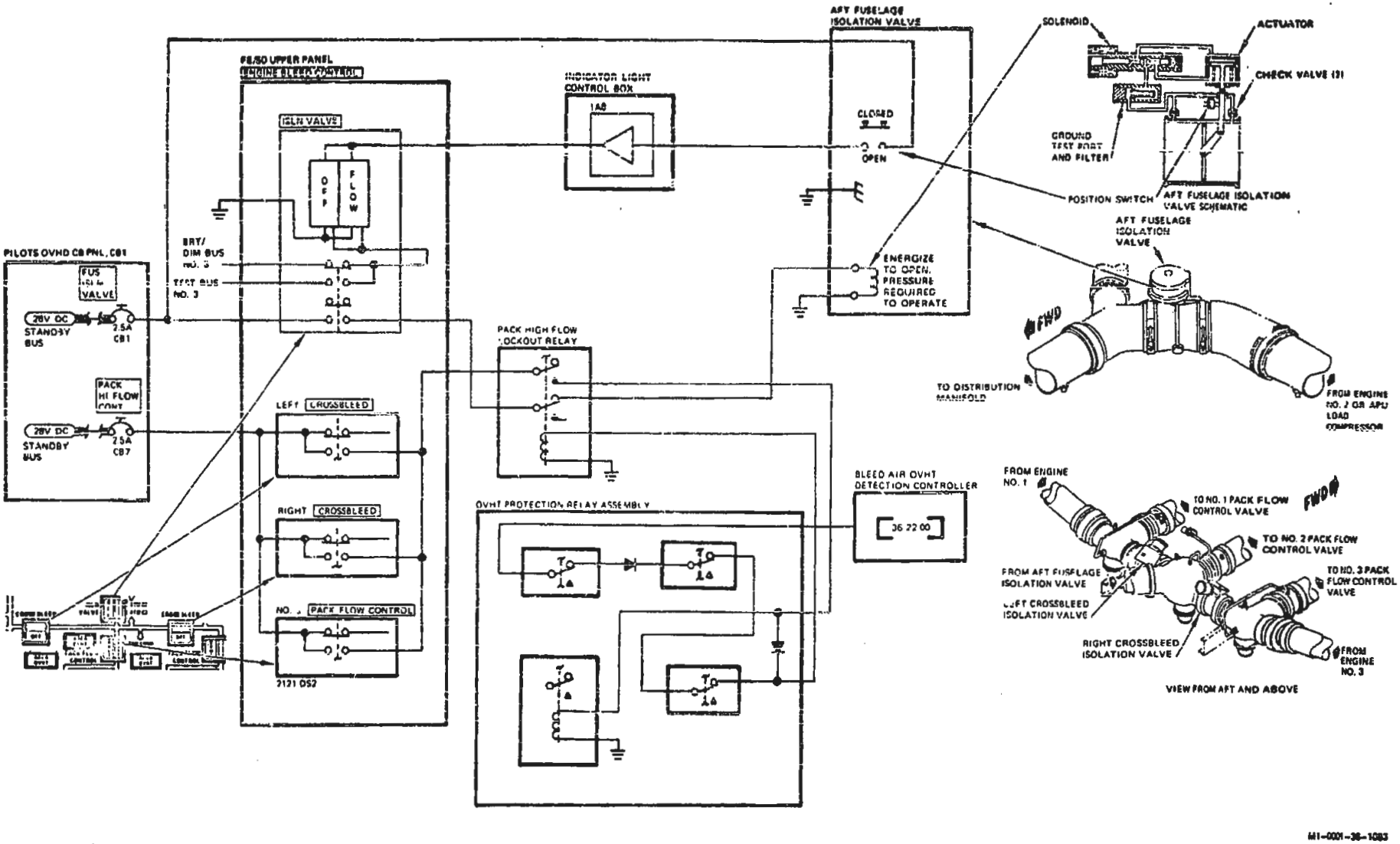
R EFFECTIVITY: 034-999 WITHOUT SB21-216
R
0018



R Aft Fuselage Duct Isolation Valve Simplified Schematic
R Figure 6

EFFECTIVITY: 001-033 WITH SB21-214

U01B



Aft Fuselage Duct Isolation Valve Simplified Schematic
Figure 6

R
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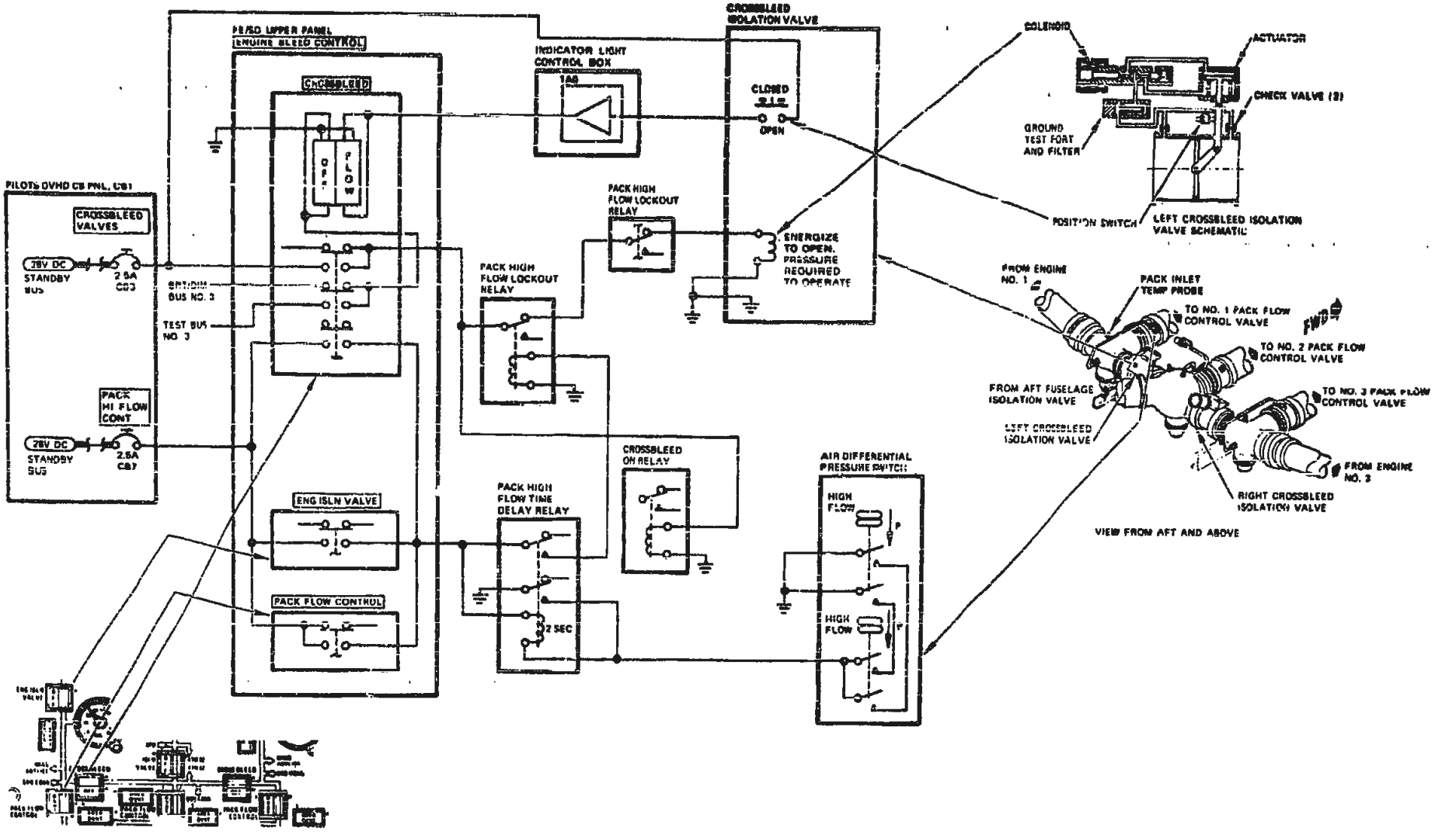
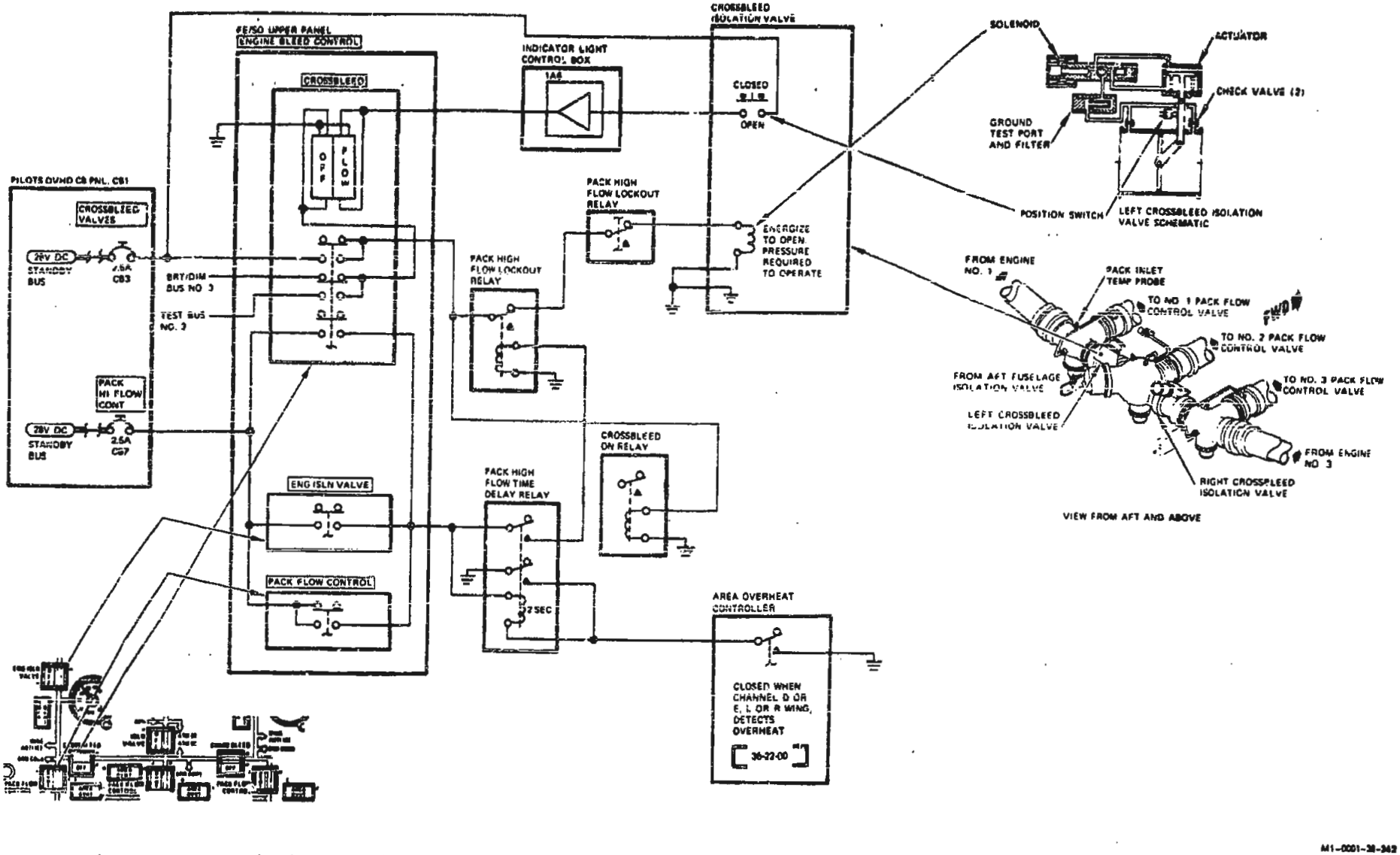
001B EFFECTIVITY: 034-999 WITH SB21-216

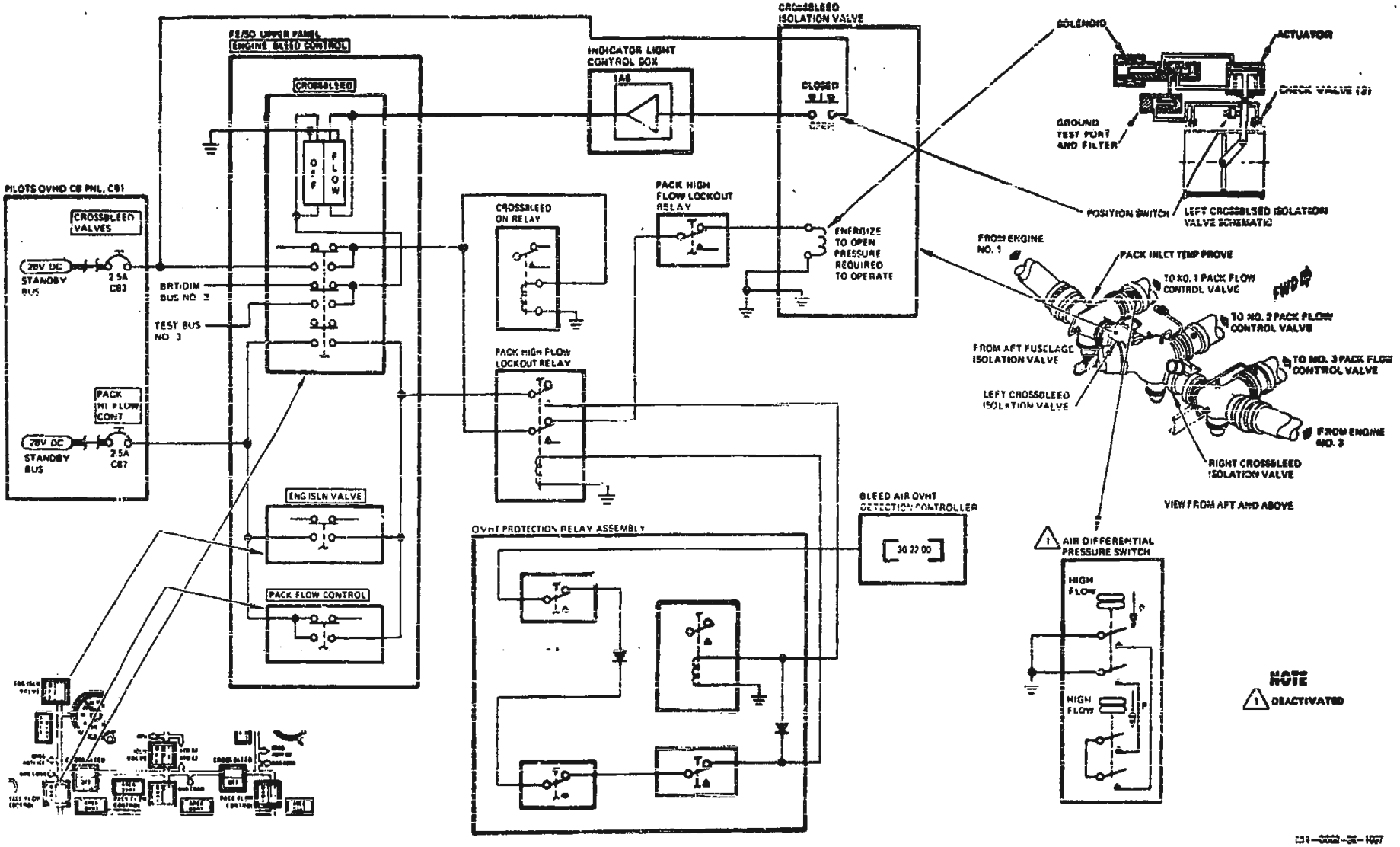


Typical Crossbleed Valves Simplified Schematic
Figure 7

R EFFECTIVITY: 001-033 WITHOUT SB21-214
R
0018



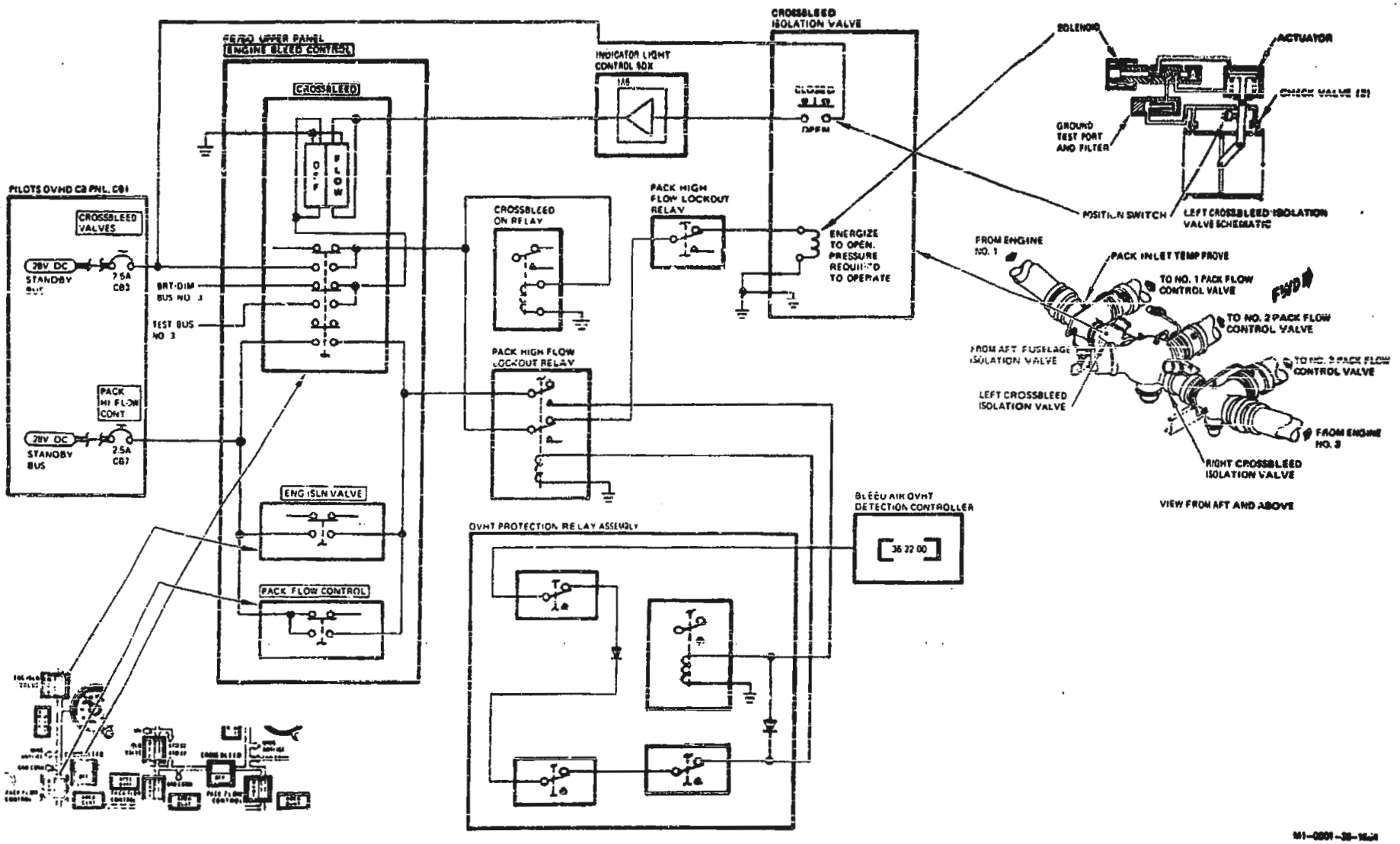
Typical Crossbleed Valves Simplified Schematic
Figure 7



R R Typical Crossbleed Valves Simplified Schematic
Figure 7

EFFECTIVITY: 001-033 WITH SB21-214

001B



R Typical Crossbleed Valves Simplified Schematic
R Figure 7

relay (Ref. Fig. 6 and 7), if the associated PACK FLOW CONTROL, ISLN VALVE, OR CROSS BLEED VALVE switchlight is latched. The time-delay relay closes when energized, locks through its own contacts, and energizes the pack high flow lockout relay. The pack high flow lockout relay closes the crossbleed and isolation valves associated with the defective duct (Ref. Fig. 8).

On aircraft 034-999 without SB21-216
if an overheat occurs in any area under the MESC floor, a ground signal from the overheat controller will energize the associated pack high flow time delay relay and provide 28VDC through its closed contacts to energize the associated pack high flow lockout relay, which will close associated PACK FLOW CONTROL, ISLN VALVE, and CROSS BLEED VALVE (Ref. Fig. 6 and 7). When the overheat clears, the ground signal from the controller will be removed, but a holding circuit through contacts of the high flow time delay relay will prevent the relay from deenergizing until 28 VDC is removed from the relay by unlatching all associated switchlights.

On aircraft 001-033 with SB21-214,
an isolation barrier is installed between pack flow control valves No. 2 and No. 3. Channels D, E, and H fenwal sensors are positioned across the upstream bleed clamps from FS943 to FS983. In the event of a duct rupture in the MESC underfloor area, one adjacent fenwal sensor will detect an overheat and actuate the excess flow logic circuits. The bleed air overheat detection controller will energize associated relays in the overheat protection relay assembly. These relays will energize the pack high flow lockout relay associated with the defective duct. A 28V dc signal from the pack high flow lockout relay is fed back into the overheat protection relay assembly to keep the lockout relay and an additional interlock relay energized. The interlock relay prevents the remaining pack high flow lockout relays from being energized in the event of a further overheat detection. The pack high flow lockout relay closes the crossbleed and isolation valves associated with the defective duct. The corresponding area overheat light will also come on but is not affected by the interlock circuit.

NOTE: The excess flow sensor is deactivated.

On aircraft 034-999 with SB21-216,
in the event of a duct rupture in the MESC underfloor area, the adjacent fenwal sensor will detect an overheat and actuate the excess flow logic circuits. The bleed air overheat detection controller will energize associated relays in the overheat protection relay assembly. These relays will energize the pack high flow lockout relay associated with the defective duct. The pack high flow

lockout relay closes the crossbleed and isolation valves associated with the defective duct.

3. Aft Fuselage Duct Isolation Valve

A. Description

The aft fuselage duct isolation valve is a butterfly type valve. Selective open and close control is through an electric solenoid in the valve, and the valve is pneumatically actuated (Ref. Fig. 6). This valve and the APU load compressor discharge duct isolation valve (Ref. 36-12-00) are identical.

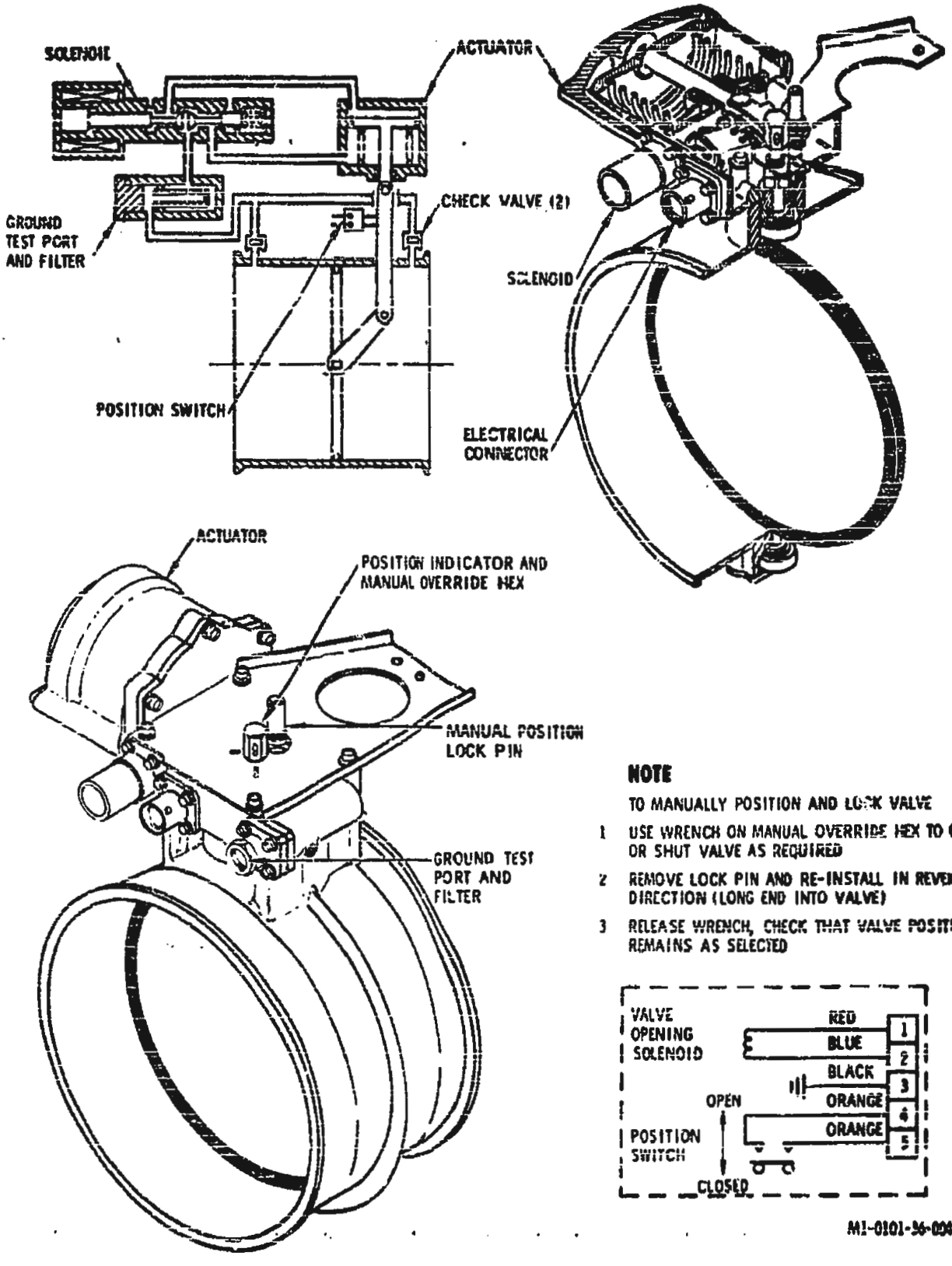
The function of this valve is to isolate all pneumatic ducting aft of the hydraulic service center from the rest of the pneumatic system when necessary or desirable.

The valve is installed in the left aft lower corner of the hydraulic service center (zone 147), in the duct going forward from the juncture of the APU load compressor discharge (Ref. 36-12-00) and the No. 2 engine bleed air system (Ref. 36-11-00) to the pneumatic crossbleed manifold under the forward portion of the wing center section (Ref. Fig. 2).

Opening and closing of the aft fuselage duct isolation valve is controlled by the aft fuselage ISLN VALVE switchlight on the Flight Engineer/Second Officers upper panel, zone 215, ENGINE BLEED CONTROL panel (Ref. Fig. 2). When the switchlight is depressed, the valve control solenoid is energized and the valve opens if pneumatic pressure is available. When the valve is open, the flowbar in the switchlight is on. When the switchlight is released, the control solenoid is deenergized, the OFF legend in the switchlight comes on. When the valve closes the flowbar goes out (Ref. Fig. 6).

The pneumatic actuator on the duct isolation valve is spring loaded to hold the valve butterfly in the closed position. Drilled ports in the valve bore, on each side of the valve butterfly, admit pneumatic pressure through two small check valves to a common chamber containing the filter. Access to the filter is through the ground check port and can be used, with ground checkout equipment, to check valve operation while installed.

From the filter chamber, pneumatic pressure goes to the control input port of the electric solenoid control valve. The two pressure ports and check valves allow pneumatic



Aft Fuselage Duct Isolation Valve
Figure 6

pressure from either side of the butterfly to be used to actuate the valve.

A manual override and position indicator lever, on the actuator end of the butterfly valve shaft, provides visual indication of valve position. A wrench hex on the shaft above the position indicator may be used to manually close the valve when necessary. A locking pin, carried in the valve housing, is then used to lock the valve closed.

B. Operation

When pneumatic pressure is not present at the valve, the valve butterfly is held closed by the spring loading on the lower side of the pneumatic actuator piston, and the valve will not open when the control solenoid is energized.

When pneumatic pressure is present, on either or both sides of the butterfly, and the electric solenoid is not energized, the solenoid control valve directs pressure to the lower (spring) side of the actuator piston and vents the upper side of the piston to ambient air, providing positive valve closure.

When the electric solenoid is energized, and pneumatic pressure is present, the solenoid control valve directs pressure to the upper side of the actuator piston and vents the lower (spring) side of the piston to ambient. Air pressure above the piston overcomes spring force to fully open the valve when duct pressure is above 8.0 psi.

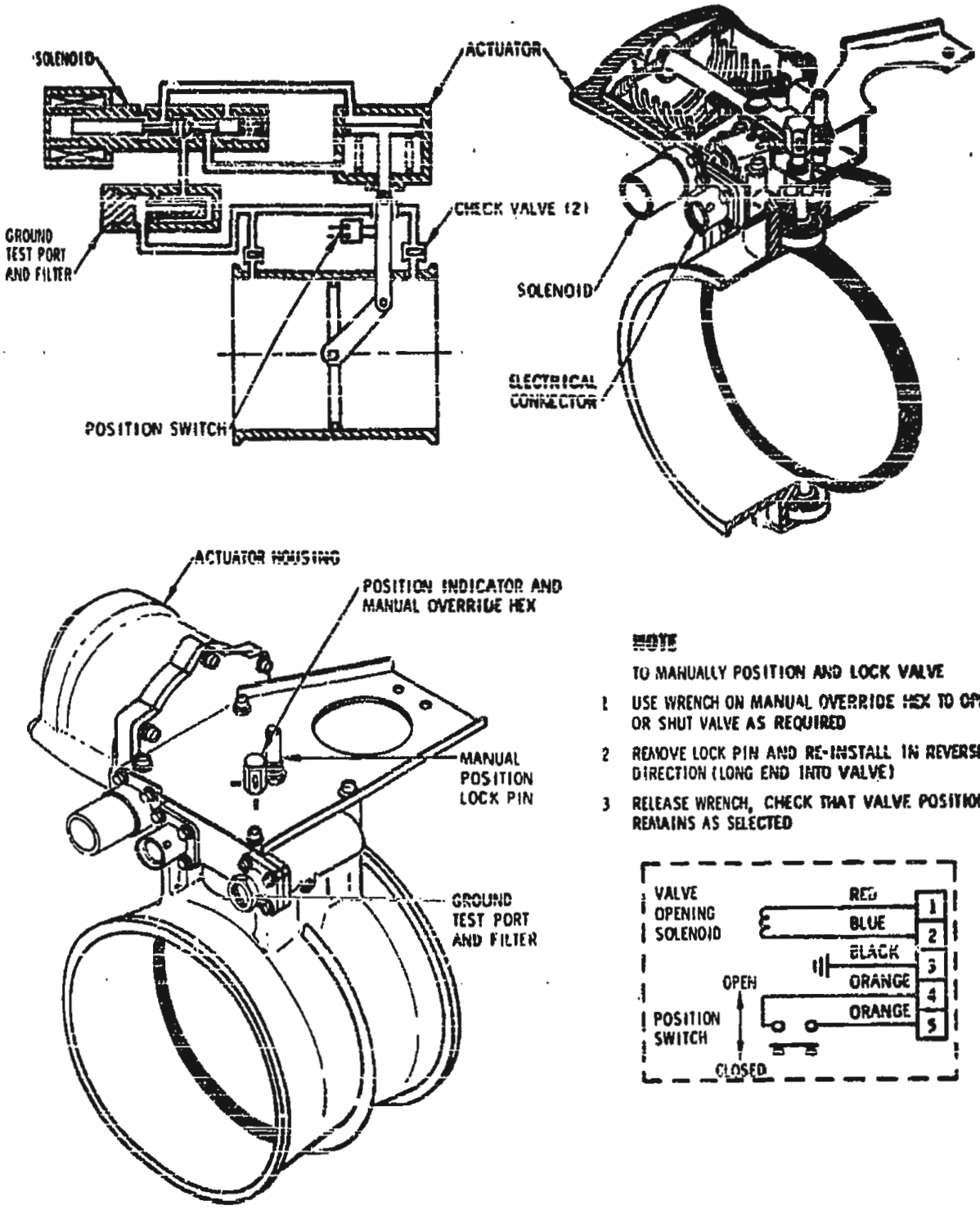
4. Crossbleed Duct Isolation Valve

A. Description

The crossbleed duct isolation valve is a butterfly type valve. Selective open and close control is through an electric solenoid in the valve, and the valve is pneumatically actuated (Ref. Fig. 9).

Two identical crossbleed duct isolation valves are used, one on each side of fuselage centerline in the cross bleed manifold under the forward portion of the wing center section, zone 143, just aft of the mid electrical service center. The function of these valves is to provide isolation of portions of the pneumatic system when necessary or desirable.

Opening and closing of the two crossbleed duct isolation valves is controlled by the left and right CROSS BLEED switchlights on the Flight Engineer/Second Officers upper



HM 6162
M1-A00-36-005

Crossbleed Duct Isolation Valve
Figure 9

panel, zone 215, ENGINE BLEED CONTROL panel. When one of these switchlights is depressed that valve control solenoid is energized and the valve opens if pneumatic pressure is available. When the valve is open the flowbar in the switchlight comes on. When the switchlight is released the control solenoid is deenergized, the OFF legend in the switchlight comes on. When the valve closes, the flowbar goes out (Ref. Fig. 7).

The pneumatic actuator on the duct isolation valve is spring loaded to hold the valve butterfly in the closed position. Drilled ports in the valve bore, on each side of the valve butterfly, admit pneumatic pressure through two small check valves to a common chamber containing the filter. Access to the filter is through the ground check port and can be used, with ground checkout equipment, to check valve operation while installed.

From the filter chamber, pneumatic pressure goes to the control input port of the electric solenoid control valve. The two pressure ports and check valves allow pneumatic pressure from either side of the butterfly to be used to actuate the valve.

A manual override and position indicator lever, on the actuator end of the butterfly valve shaft, provides visual indication of valve position. A wrench hex on the shaft above the position indicator may be used to manually close the valve when necessary. A locking pin, carried in the valve housing, is then used to lock the valve closed.

B. Operation

When pneumatic pressure is not present at the valve, the valve butterfly is held closed by the spring loading on the lower side of the pneumatic actuator piston, and the valve will not open when the control solenoid is energized.

When pneumatic pressure is present, on either or both sides of the butterfly, and the electric solenoid is not energized, the solenoid control valve directs pressure to the lower (spring) side of the actuator piston and vents the upper side of the piston to ambient air, providing positive valve closure.

When the electric solenoid is energized, and pneumatic pressure is present, the solenoid control valve directs pressure to the upper side of the actuator piston and vents the lower (spring) side of the piston to ambient. Air pressure above the piston overcomes spring force to fully open the valve when duct pressure is above 6.0 psi.

5. Mid and Aft Fuselage Duct Compensators

A. Description

The mid and aft fuselage duct compensators are identical telescopic ducting assemblies using sliding seals and the differential area principle so that they decrease in length (telescope) with internal air pressure. Their function is to maintain tension upon a length of pneumatic ducting to compensate for changes in duct length due to temperature changes (Ref. Fig. 10).

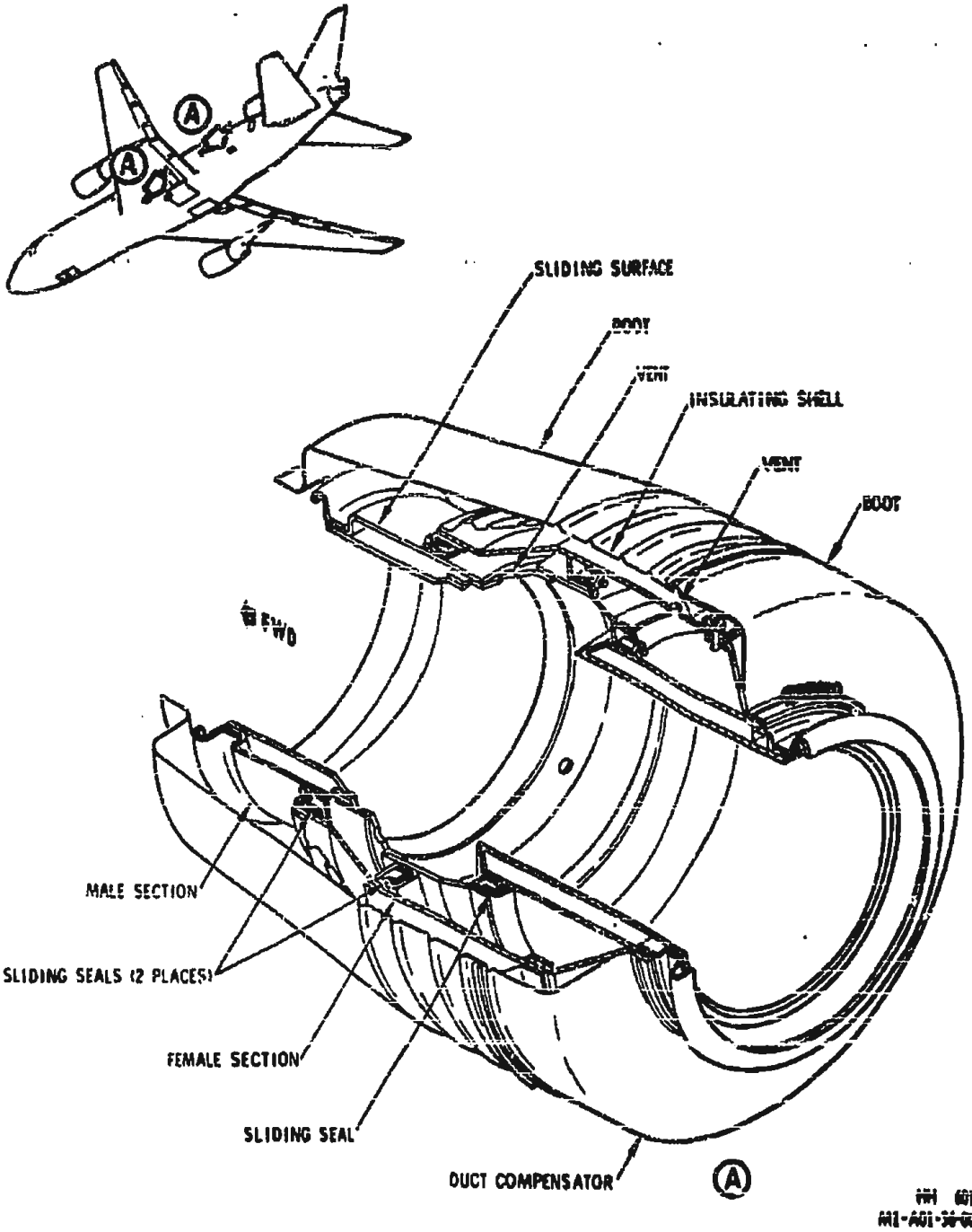
The compensator is flange mounted at both ends, using single T-bolt V-band couplings without gaskets between the compensator and the ducts. It is composed of two titanium sections with sliding seals, an insulating shell of phenolic resin impregnated fiber glass covering the larger diameter section, and two rubberized fabric boots, one on each end. The mounting flanges mate with the 8.0 inch diameter supply duct, and the maximum shell diameter is 13.6 inches. The unit installed length, at normal temperatures, is 15.5 inches. At very low duct temperatures it will extend to 16.0 inches, and at very high duct temperatures it will telescope to as short as 12.0 inches.

The female (largest diameter) section of the compensator consists of two concentric tubular sections joined at the mounting flange end by bolts around the larger diameter perimeter, for disassembly. The shorter, inner tube, with the mounting flange, is double walled. The outer tube is longer, with a sliding seal at the end opposite the mounting flange.

The male section is a two diameter, almost bell-shaped, unit. The smaller diameter is at the mounting flange end, and is double walled tubing at this point. The tube is then flared out to the larger diameter and carries two sliding seals.

The sliding seal inside the female section slides on the outer surface of the smaller diameter (double walled) portion of the male section. The two sliding seals on the larger end of the male section slide on the outer surface of the small diameter tube and the inner surface of the large diameter tube forming the female section.

The area between the inner and outer tubes of the female section near the mounting flange is vented to ambient. The area between the sliding seals is exposed to duct pressure. The effective outer diameter of the seals on the male section is considerable larger than the inner diameter of



Mid and Aft Fuselage Duct Compensator
Figure 10

the seal on the end of the female section, giving a differential in surface areas bearing duct air pressure.

The insulating shell covers the large diameter female section except for the area from the disassembly bolts to the mounting flange, where one of the boots is installed. The other, longer, boot extends from the end of the large diameter female section to the other mounting flange (male) end, and provides environmental protection to prevent damage to the otherwise exposed sliding surface on the male section.

The mid-fuselage duct compensator is installed below the wing center section, on the left side, just forward of the hydraulic service center, zone 143. It maintains tension on the ducting from the aft end of the hydraulic service center to the crossbleed manifold under the forward portion of the wing center section.

The aft fuselage duct compensator is in the left cheek area outboard of the center cargo compartment, zone 153. The compensator maintains tension on the ducting between the junction of the engine No. 2 bleed air and APU load compressor discharge ducts and the pressure bulkhead aft of the left main wheel well.

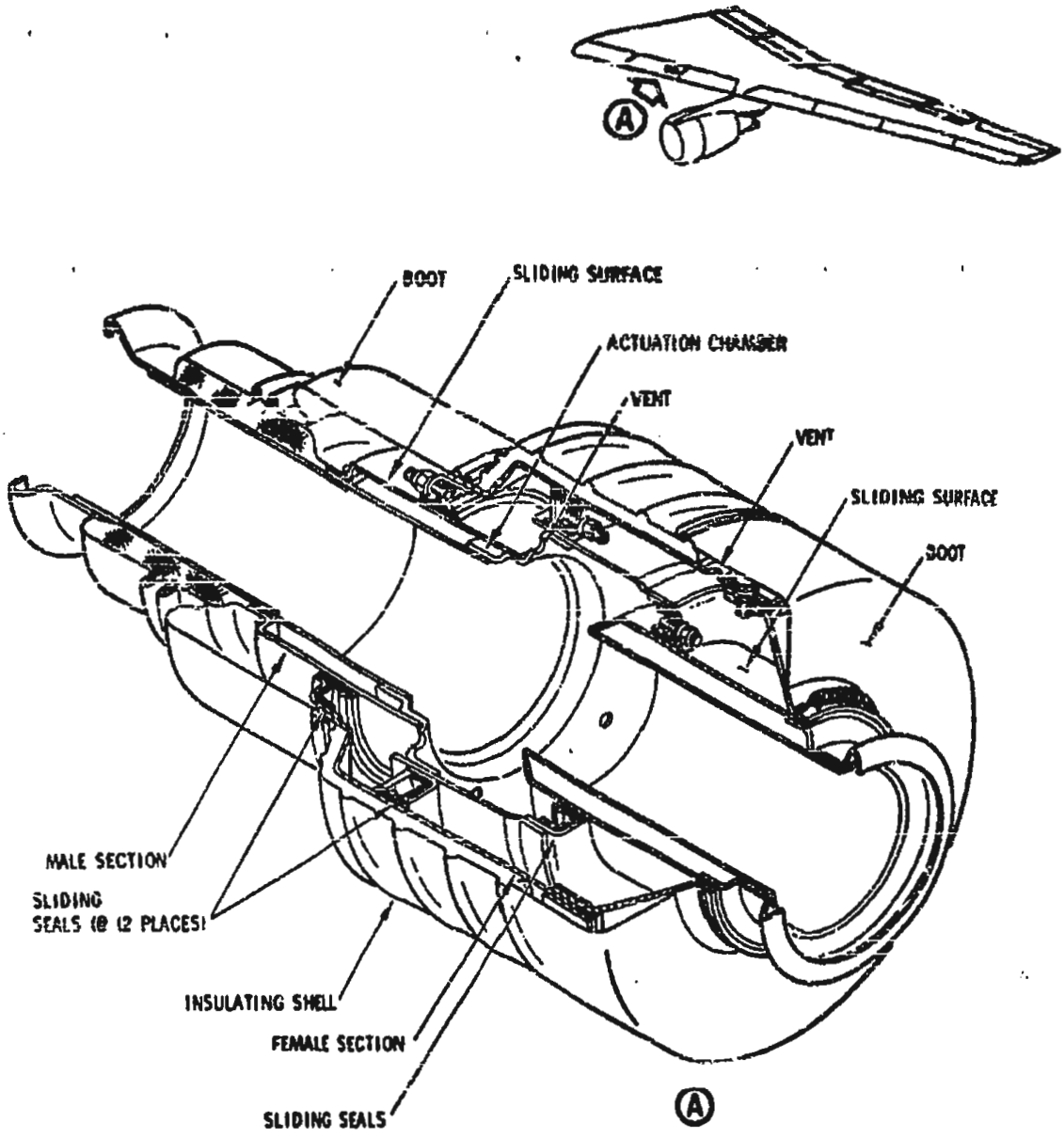
B. Operation

When the duct compensator is installed, and the duct pressurized, air pressure between the two seals on the inside end of the male section and the seal in the end of the female section tries to force these seals apart (Ref. Fig. 10). The result is that the compensator shortens (telescopes) to apply tension to the ducting between fixed support points. Duct support bracketing between these points provides for fore and aft movement of the ducting as necessary to allow the duct compensator to uniformly tension the full length of ducting.

6. Wing Duct Compensators

A. Description

The wing duct compensators are telescopic ducting assemblies using sliding seals and the differential area principle so that they decrease in length (telescope) with internal air pressure. Their function is to maintain tension upon a length of pneumatic ducting to compensate for changes in duct length due to temperature changes (Ref. Fig. 11).



M1-A01-36-002

Wing Duct Compensator
Figure 11

Two identical wing duct compensators are used. One is installed in the leading edge of each wing between the engine pylon and the fuselage, zones 510 and 610. Forming part of the duct, each compensator maintains tension upon the ducting between the pylon-to-wing bulkhead and the crossbleed manifold under the forward portion of the wing center section.

Each compensator is flange mounted at both ends, using single T-bolt V-band couplings, without gaskets between the compensator and the ducts. It is composed of two titanium sections with sliding seals, an insulating shell of phenolic resin impregnated fiberglass covering the larger diameter section, and two rubberized fabric boots, one on each end. The mounting flanges mate with the 6.0 inch diameter supply duct, and the maximum shell diameter is 10.5 inches. The unit installed length, at normal temperatures, is 14.0 inches. At very low duct temperatures it will extend to 14.5 inches, and at very high duct temperatures it will telescope to as short as 12.25 inches.

The female (largest diameter) section of the compensator consists of two concentric tubular sections joined at the mounting flange end by bolts around the larger diameter perimeter, for disassembly. The shorter, inner tube, with the mounting flange, is double walled. The outer tube is longer, with a sliding seal at the end opposite the mounting flange.

The male section is a two diameter, almost bell-shaped, unit. The smaller diameter is at the mounting flange end, and is double walled tubing at this point. The tube is then flared out to the larger diameter and carries two sliding seals.

The sliding seal inside the female section slides on the outer surface of the smaller diameter (double walled) portion of the male section. The two sliding seals on the larger end of the male section slide on the outer surface of the small diameter tube and the inner surface of the large diameter tube forming the female section.

The area between the inner and outer tubes of the female section near the mounting flange is vented to ambient pressure. The area between the sliding seals is exposed to duct pressure. The effective outer diameter of the seals on the male section is considerably larger than the inner diameter of the seal on the end of the female section, giving a differential in surface areas bearing duct air pressure.

The insulating shell covers the larger diameter female section except for the area from the disassembly bolts to the mounting flange, where one of the boots is installed. The other, longer, boot extends from the end of the large diameter female section to the other mounting flange (male) end, and provides environmental protection to prevent damage to the otherwise exposed sliding surface on the male section.

B. Operation

When the duct compensator is installed, and the duct pressurized, air pressure between the two seals on the inside end of the male section and the seal in the end of the female section tries to force these seals apart (Ref. Fig. 11). The result is that the compensator shortens (telescopes) to apply tension to the ducting between the pylon/wing bulkhead and the crossbleed manifold under the forward portion of the wing center section. Duct support bracketing between these points provides for movement of the ducting as necessary to allow the duct compensator to uniformly tension the full length of ducting.

R # DISTRIBUTION MANIFOLD SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting Distribution Manifold System faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

R PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Distribution Manifold System. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 is a list of all fault isolation data in this section of the manual.

R Distribution Manifold System Fault Isolation Data
R TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Aft Isolation Valve or Crossbleed Valve Fault
104	Pack High Flow Fault
SCHEM 1	Left Crossbleed Valve Schematic
SCHEM 2	Right Crossbleed Valve Schematic
SCHEM 3	Aft Isolation Valve Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
CROSSBLEED – VALVES 3614-CB2	1	PILOTS OVHD CB PNL CB1/P7	*
CROSSBLEED – VALVES 3614-CB3	1	PILOTS OVHD CB PNL CB1/P7	*
FUS – ISLN – VALVE 3614-CB1	1	PILOTS OVHD CB PNL CB1/P7	*
PACK – HI FLOW – CONT 3611-CB7	1	PILOTS OVHD CB PNL CB1/P7	*
COMPENSATORS:			
DUCT – AFT FUSELAGE	1	CENTER CARGO COMPT/153HL	36-14-06
DUCT – LEFT WING	1	INBD LE WING/511GB	36-14-10
DUCT – MID FUSELAGE	1	UNDER WING BOX/142DB	36-14-06
DUCT – RIGHT WING	1	INBD LE WING/611GB	36-14-10
DUCT TOLERENCE – WINGS	2	BELOW WING CENTER SECTION/142DB	36-14-06
CONTROL BOX, INDICATOR LIGHTS 3317-A1 (ILCB):			
CARD 1A6	1	FESC/112AB	33-17-04
CARD 1A8	1	FESC/112AB	33-17-04
CARD 1A32	1	FESC/112AB	33-17-04
SWITCH – AIR DIFFERENTIAL PRESSURE, PACK 1 3611-A7	1	MESC/137AB	36-14-24
SWITCH – AIR DIFFERENTIAL PRESSURE, PACK 2 3611-A8	1	MESC/137AB	36-14-24
SWITCH – AIR DIFFERENTIAL PRESSURE, PACK 3 3611-A9	1	MESC/137AB	36-14-24
SWITCHLIGHTS:			
ISLN VALVE 3614-DS3	1	ENGINE BLEED CONTROL PNL/P11	*
LEFT CROSSBLEED 3614-DS1	1	ENGINE BLEED CONTROL PNL/P11	*
RIGHT CROSSBLEED 3614-DS2	1	ENGINE BLEED CONTROL PNL/P11	*
RELAYS:			
CROSSBLEED ON, LEFT 3699-K2	1	FESC, BOTTOM OF FWD RH RACK/112AB	*
CROSSBLEED ON, RIGHT 3699-K3	1	FESC, BOTTOM OF FWD RH RACK/112AB	*
HIGH FLOW LOCKOUT, PACK 1 3611-K26	1	MESC, AFT RH RELAY PNL/ 252GR-1	*
HIGH FLOW LOCKOUT, PACK 2 3611-K27	1	MESC, AFT RH RELAY PNL/ 252GR-1	*

*SEE WM EQUIPMENT LIST

M1-0000-36-8097

Component Location Index
Figure 101 (Sheet 1)

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
CROSSBLEED – VALVES 3614-CB2	1	PILOTS OVHD CB PNL CB1/P7	*
CROSSBLEED – VALVES 3614-CB3	1	PILOTS OVHD CB PNL CB1/P7	*
FUS – ISLN – VALVE 3614-CB1	1	PILOTS OVHD CB PNL CB1/P7	*
PACK – HI FLOW – CONT 3611-CB7	1	PILOTS OVHD CB PNL CB1/P7	*
COMPENSATORS:			
DUCT – AFT FUSELAGE	1	CENTER CARGO COMPT/163FL	36-14-08
DUCT – LEFT WING	1	INBD LE WING/511GB	36-14-10
DUCT – MID FUSELAGE	1	UNDER WING BOX/142DB	36-14-09
DUCT – RIGHT WING	1	INBD LE WING/611GB	36-14-10
DUCT TOLERENCE – WINGS	2	BELOW WING CENTER SECTION/142DB	36-14-05
CONTROL BOX, INDICATOR LIGHTS 3317-A1 (ILCB):			
CARD 1A6	1	FESC/112AB	33-17-04
CARD 1A8	1	FESC/112AB	33-17-04
CARD 1A32	1	FESC/112AB	33-17-04
SWITCHLIGHTS:			
ISLN VALVE 3614-DS3	1	ENGINE BLEED CONTROL PNL/P11	*
LEFT CROSSBLEED 3614-DS1	1	ENGINE BLEED CONTROL PNL/P11	*
RIGHT CROSSBLEED 3614-DS2	1	ENGINE BLEED CONTROL PNL/P11	*
RELAYS:			
CROSSBLEED ON, LEFT 3699-K2	1	FESC, BOTTOM OF FWD RH RACK/112AB	*
CROSSBLEED ON, RIGHT 3699-K3	1	FESC, BOTTOM OF FWD RH RACK/112AB	*
HIGH FLOW LOCKOUT, PACK 1 3611-K26	1	MESC, AFT RH RELAY PNL/ 252GR-1	*
HIGH FLOW LOCKOUT, PACK 2 3611-K27	1	MESC, AFT RH RELAY PNL/ 252GR-1	*

*SEE WM EQUIPMENT LIST

M1-0000-36-344

Component Location Index
Figure 101 (Sheet 1)

COMPONENT	QTY	AREA/ACCESS	REFERENCE
HIGH FLOW LOCKOUT, PACK 3 3811-K28	1	MESC, AFT RH RELAY PNL/ 2520R-1	•
HIGH FLOW TIME DELAY, PACK 1 3811-K23	1	MESC, AFT RH RELAY PNL/ 2520R-1	•
HIGH FLOW TIME DELAY, PACK 2 3811-K24	1	MESC, AFT RH RELAY PNL/ 2520R-1	•
HIGH FLOW TIME DELAY, PACK 3 3811-K25	1	MESC, AFT RH RELAY PNL/ 2520R-1	•
VALVE – DRAIN CONDENSATE	2	MSC, LH MAIN WHEELWELL /1478B, 732A	36-14-23
VALVE – DUCT ISOLATION, AFT FUSELAGE 3414-A1	1	MSC, AFT LEFT/1478B	36-14-01
VALVE – DUCT ISOLATION, LEFT CROSSBLEED 3814-A2	1	X-BLEED MANIFOLD/142DB	36-14-02
VALVE – DUCT ISOLATION, RIGHT CROSSBLEED 3814-A3	1	X-BLEED MANIFOLD/142DB	36-14-02

*SEE WM EQUIPMENT LIST

M1-0000-36-0000

Component Location Index
Figure 101 (Sheet 2)

R R 001B EFFECTIVITY: 001-033 WITHOUT SB21-214, AND 034-036 WITHOUT SB21-216

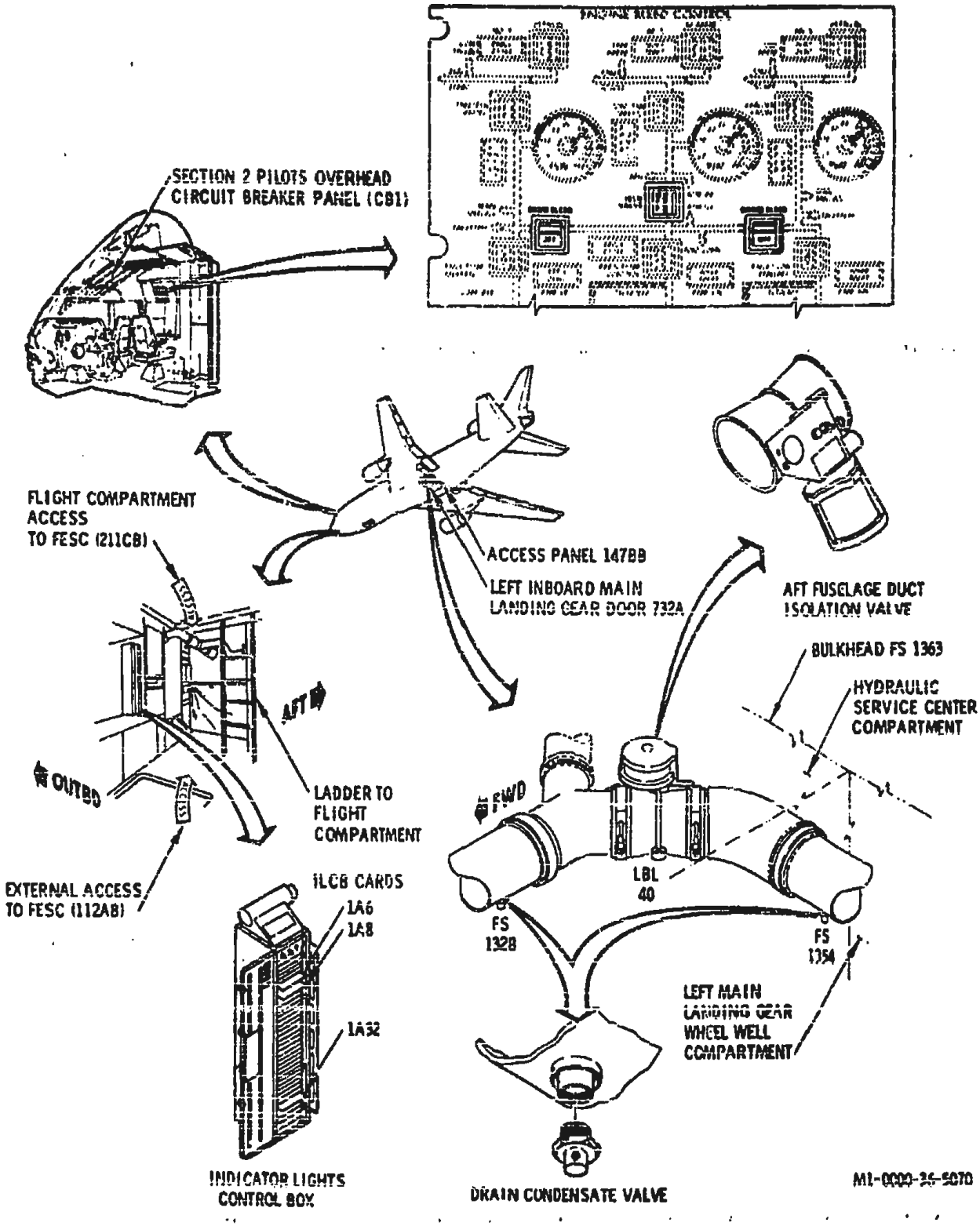
COMPONENT	QTY	AREA/ACCESS	REFERENCE
HIGH FLOW LOCKOUT, PACK 3 3811-K28	1	MESC, AFT RH RELAY PNL/2328R1	#
BLEED AIR OVERHEAT TEST RELAY 3822-K8	1	MESC, OVERHEAT PROTECTION RELAY PNL/2526R1	#
CHANNEL D INTERLOCK RELAY	1	MESC, OVERHEAT PROTECTION RELAY PNL/2526R1	#
CHANNEL H INTERLOCK RELAY	1	MESC, OVERHEAT PROTECTION RELAY PNL/2526R1	#
CHANNEL E INTERLOCK RELAY	1	MESC, OVERHEAT PROTECTION RELAY PNL/2526R1	#
VALVE - DRAIN CONDENSATE	2	HSC, LH MAIN WHEELWELL /1478B, 732A	36-14-23
VALVE - DUCT ISOLATION, AFT FUSELAGE 3414-A1	1	HSC, AFT LEFT/1478B	36-14-02
VALVE - DUCT ISOLATION, LEFT CROSSBLEED 3814-A2	1	X-BLEED MANIFOLD/1420B	36-14-02
VALVE - DUCT ISOLATION, RIGHT CROSSBLEED 3814-A3	1	X-BLEED MANIFOLD/1420B	36-14-02

SEE WH EQUIPMENT LIST

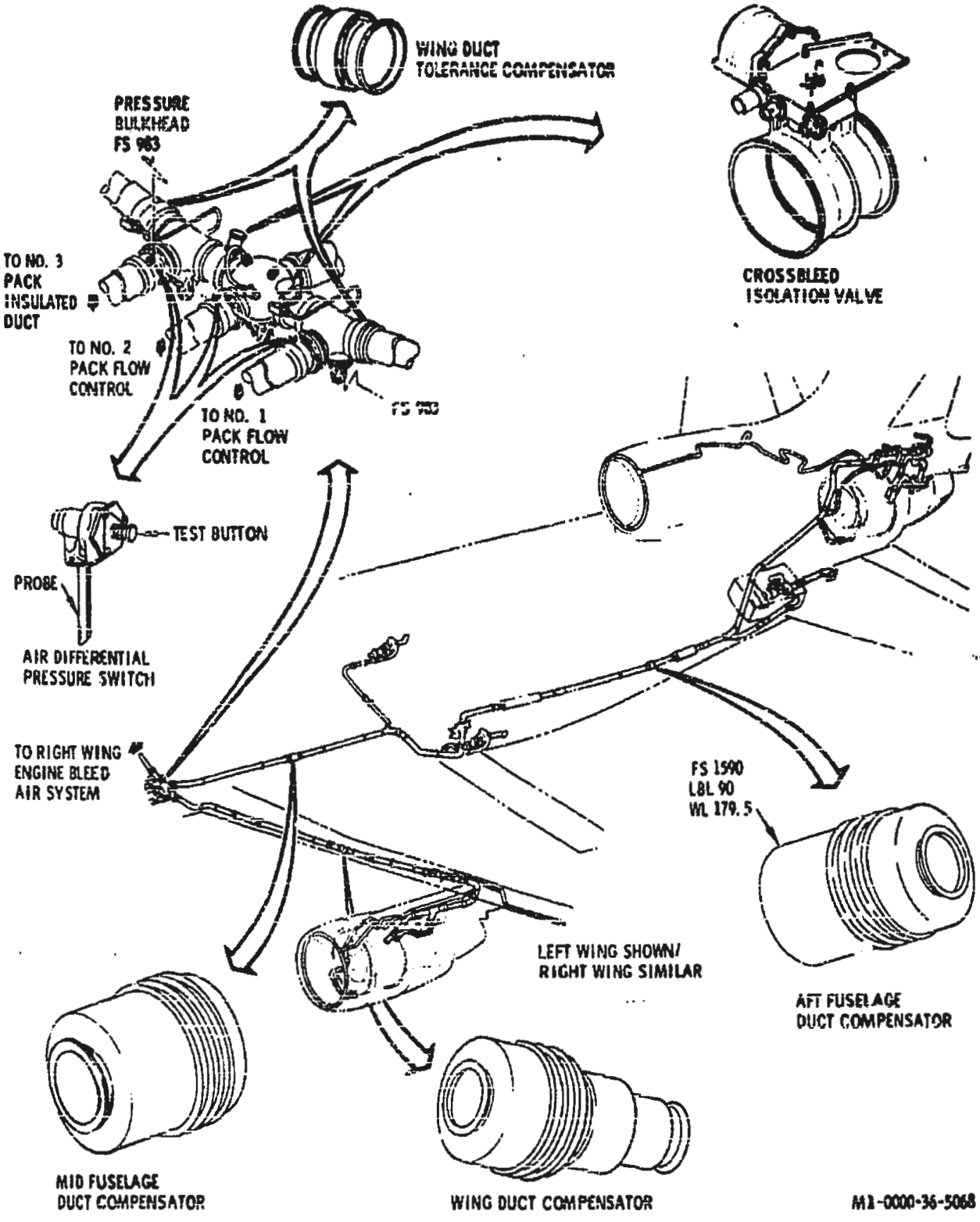
41-0000-38-1007

Component Location Index
Figure 101 (Sheet 2)

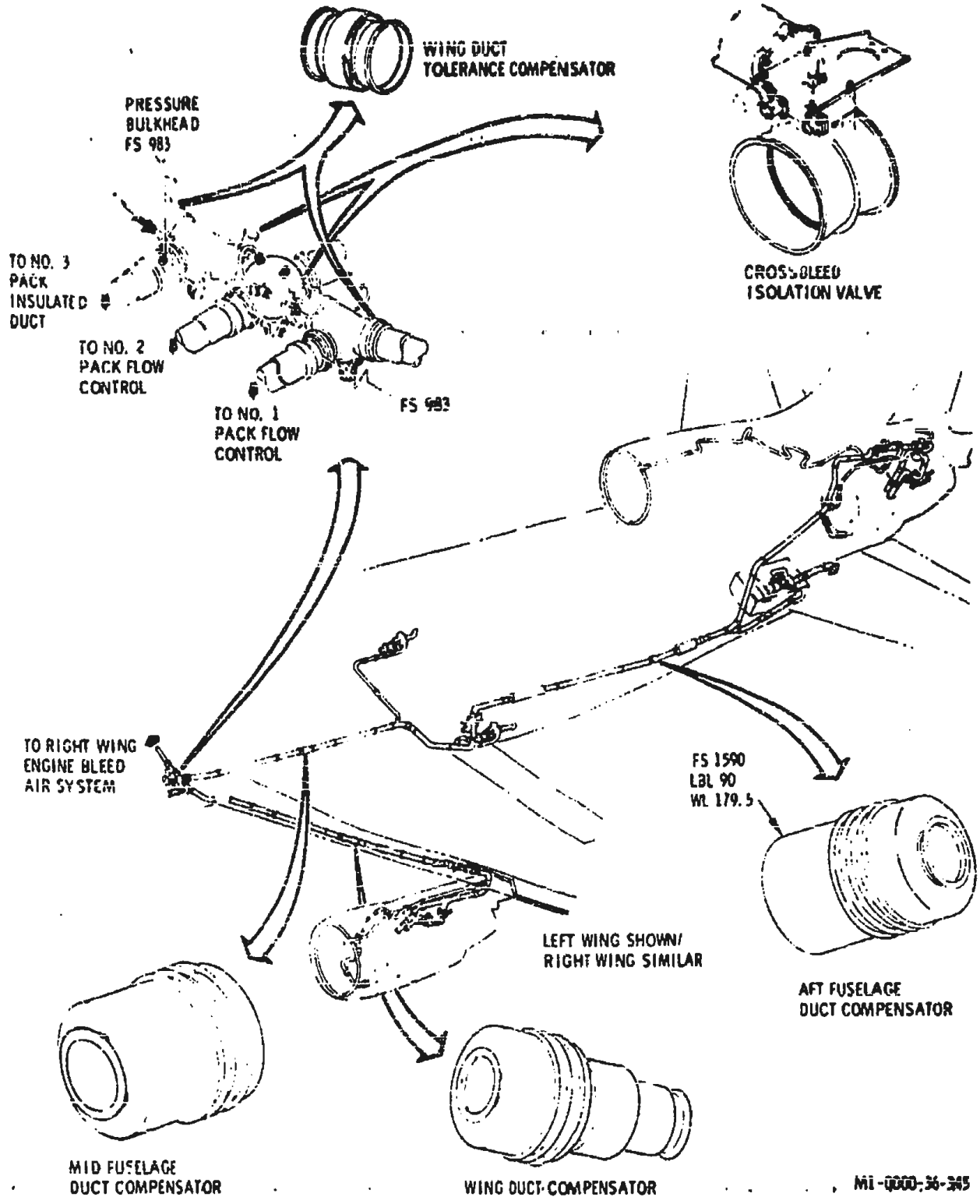
R EFFECTIVITY: 001-033 WITH SB21-214 AND
R 034-036 WITH SB21-216
001B



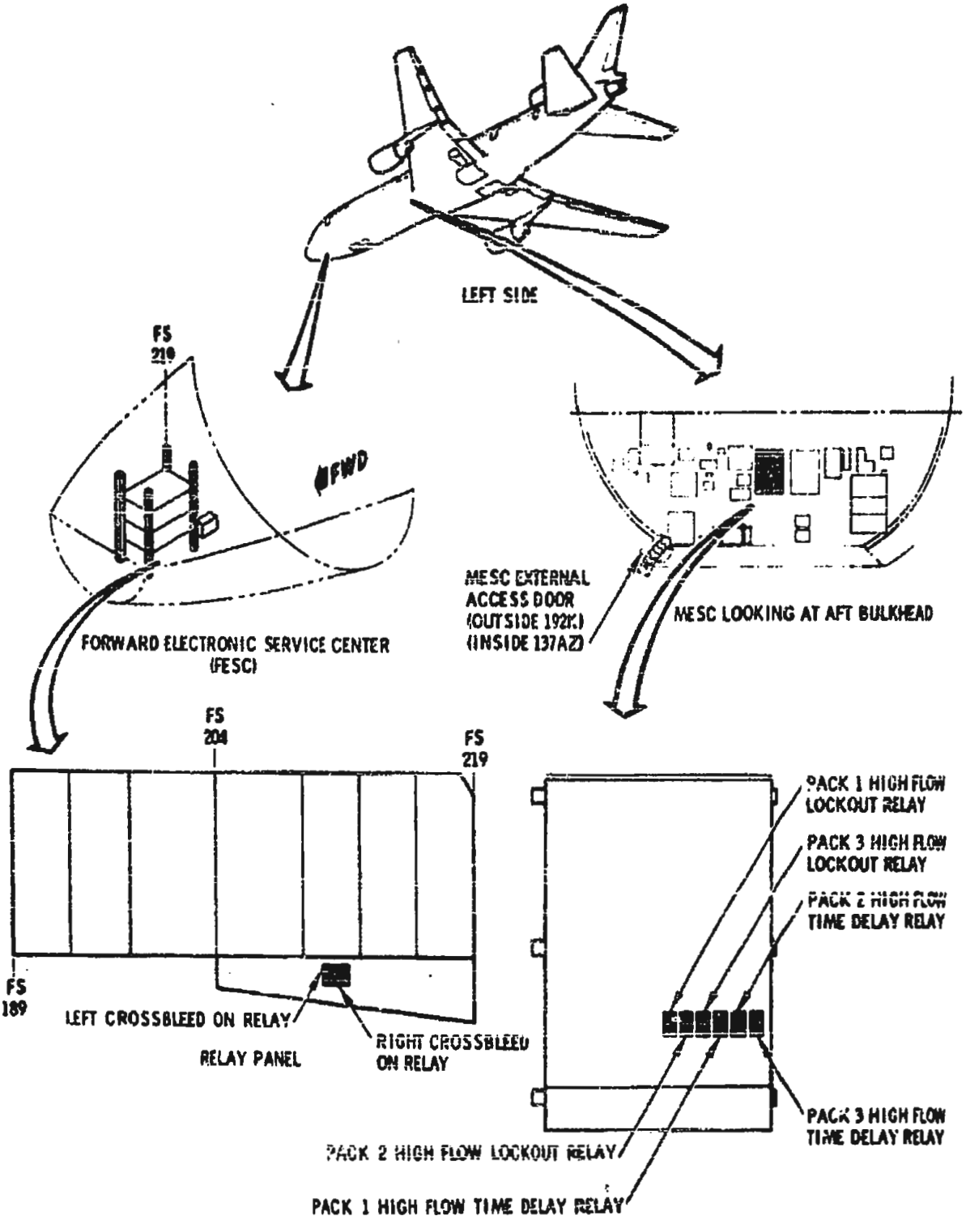
Component Locator Diagram
Figure 102 (Sheet 1)



Component Locator Diagram
Figure 102 (Sheet 2)

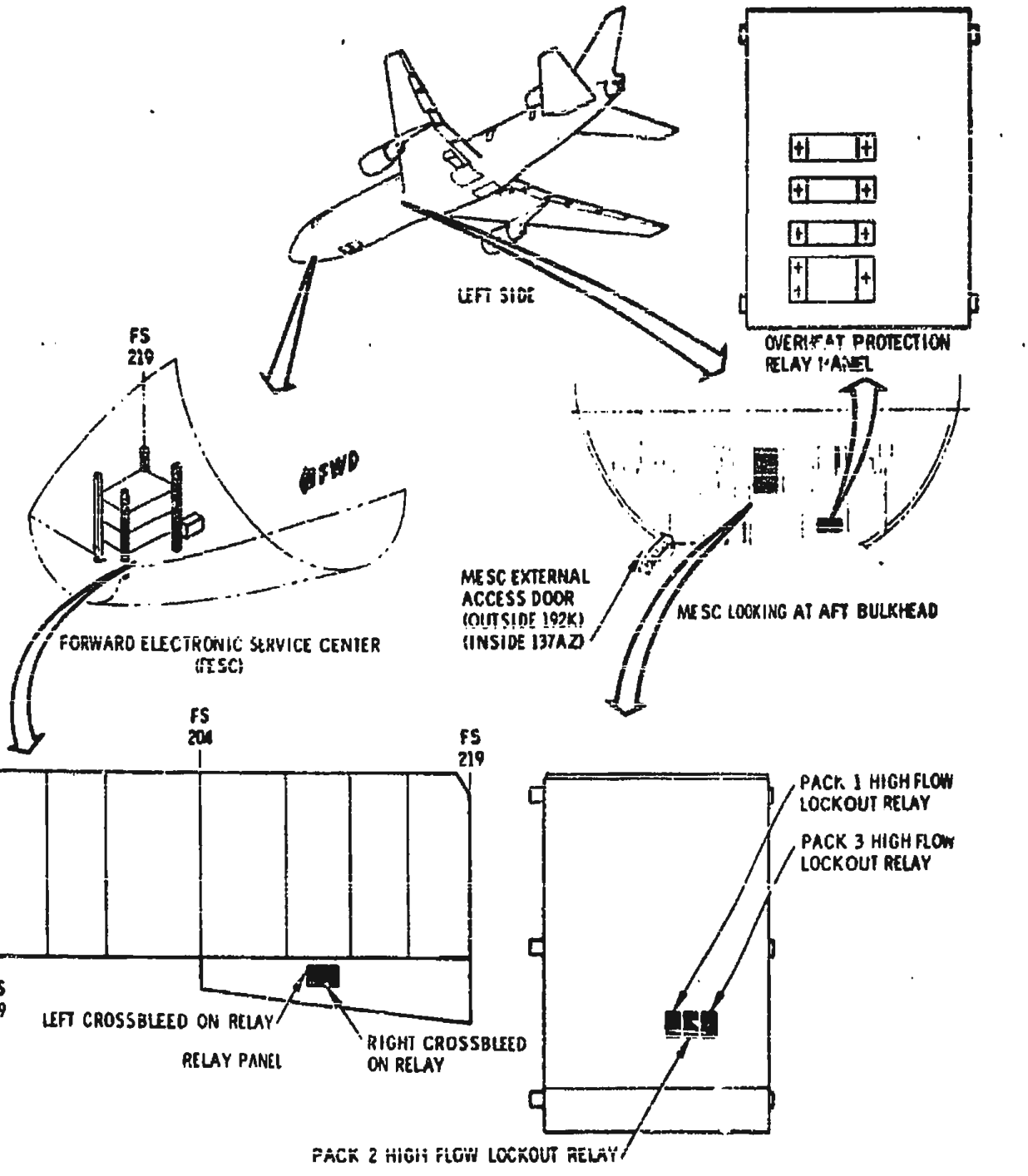


Component Locator Diagram
Figure 102 (Sheet 2)


LEFT SIDE
FS 219
FWD
FORWARD ELECTRONIC SERVICE CENTER (FESC)
MESC EXTERNAL ACCESS DOOR (OUTSIDE 192K) (INSIDE 137AZ)
MESC LOOKING AT AFT BULKHEAD
FS 204
FS 219
FS 189
LEFT CROSSBLEED ON RELAY
RELAY PANEL
RIGHT CROSSBLEED ON RELAY
PACK 1 HIGH FLOW LOCKOUT RELAY
PACK 3 HIGH FLOW LOCKOUT RELAY
PACK 2 HIGH FLOW TIME DELAY RELAY
PACK 3 HIGH FLOW TIME DELAY RELAY
PACK 2 HIGH FLOW LOCKOUT RELAY
PACK 1 HIGH FLOW TIME DELAY RELAY

M1-1000-36-5069

Component Locator Diagram
Figure 102 (Sheet 3)



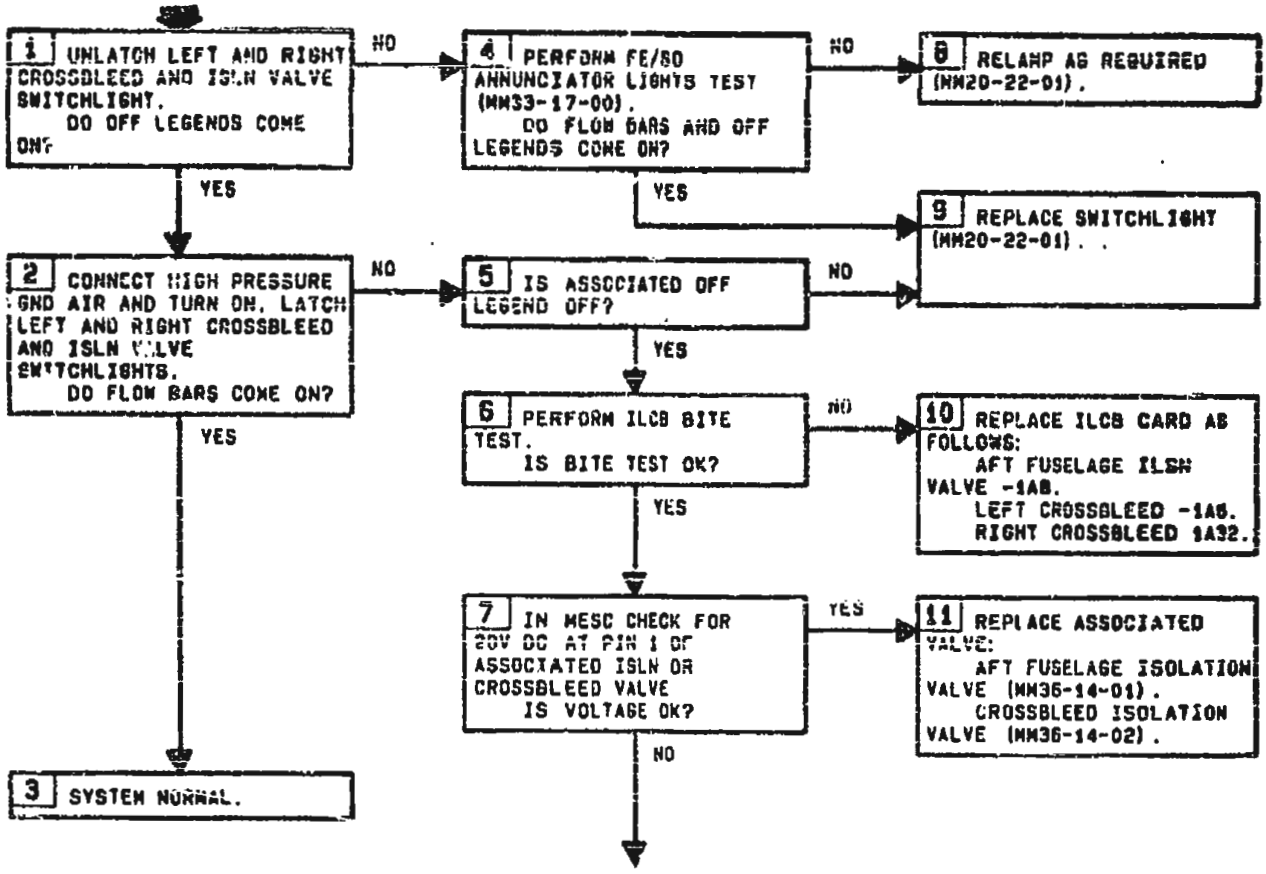
M1-0000-36-1028

Component Locator Diagram
Figure 102 (Sheet 3)

R EFFECTIVITY: 001-033 WITH SB21-214 AND
R 034-036 WITH SB21-216
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S IN: 1B16, 1B17, 1B18, 1B28

AFT ISOLATION VALVE OR CROSSBLEED VALVE INOPERATIVE

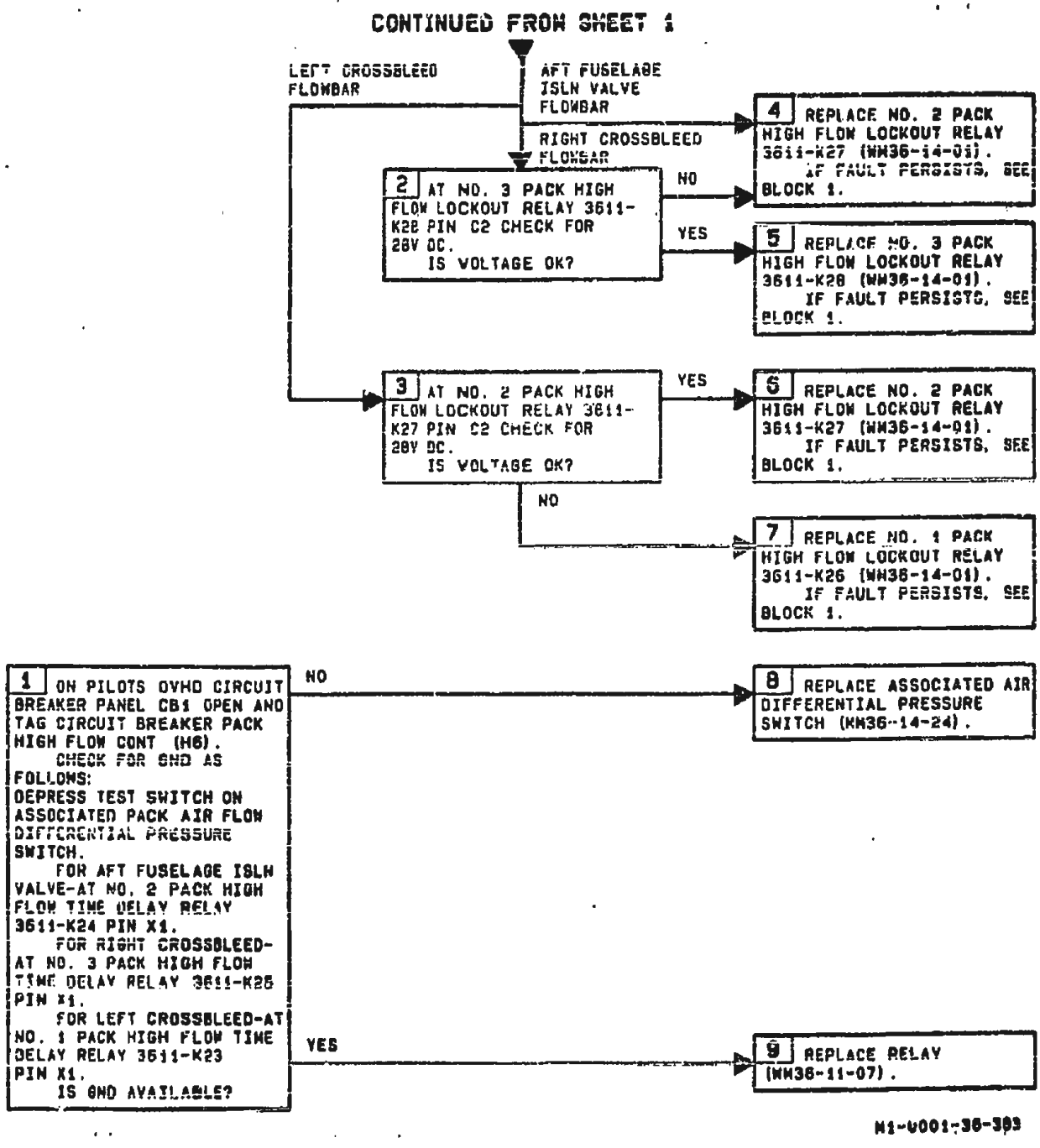

1 UNLATCH LEFT AND RIGHT CROSSBLEED AND ISLN VALVE SWITCHLIGHT.
DO OFF LEGENDS COME ON?
NO
YES
4 PERFORM FE/SO ANNUNCIATOR LIGHTS TEST (MM33-17-00).
DO FLOW BARS AND OFF LEGENDS COME ON?
NO
YES
8 RELAMP AS REQUIRED (MM20-22-01).
9 REPLACE SWITCHLIGHT (MM20-22-01).
2 CONNECT HIGH PRESSURE GND AIR AND TURN ON. LATCH LEFT AND RIGHT CROSSBLEED AND ISLN VALVE SWITCHLIGHTS.
DO FLOW BARS COME ON?
NO
YES
5 IS ASSOCIATED OFF LEGEND OFF?
NO
YES
6 PERFORM ILCB BITE TEST.
IS BITE TEST OK?
NO
YES
10 REPLACE ILCB CARD AS FOLLOWS:
AFT FUSELAGE ILSN VALVE -1AB.
LEFT CROSSBLEED -1A6.
RIGHT CROSSBLEED 1A32.
7 IN MESC CHECK FOR 28V DC AT PIN 1 OF ASSOCIATED ISLN OR CROSSBLEED VALVE
IS VOLTAGE OK?
YES
NO
11 REPLACE ASSOCIATED VALVE:
AFT FUSELAGE ISOLATION VALVE (MM36-14-01).
CROSSBLEED ISOLATION VALVE (MM36-14-02).
3 SYSTEM NORMAL.

CONTINUED ON SHEET 2

M1-D002-36-382

R Aft Isolation Valve or Crossbleed Valve Faults
R Figure 103 (Sheet 1)

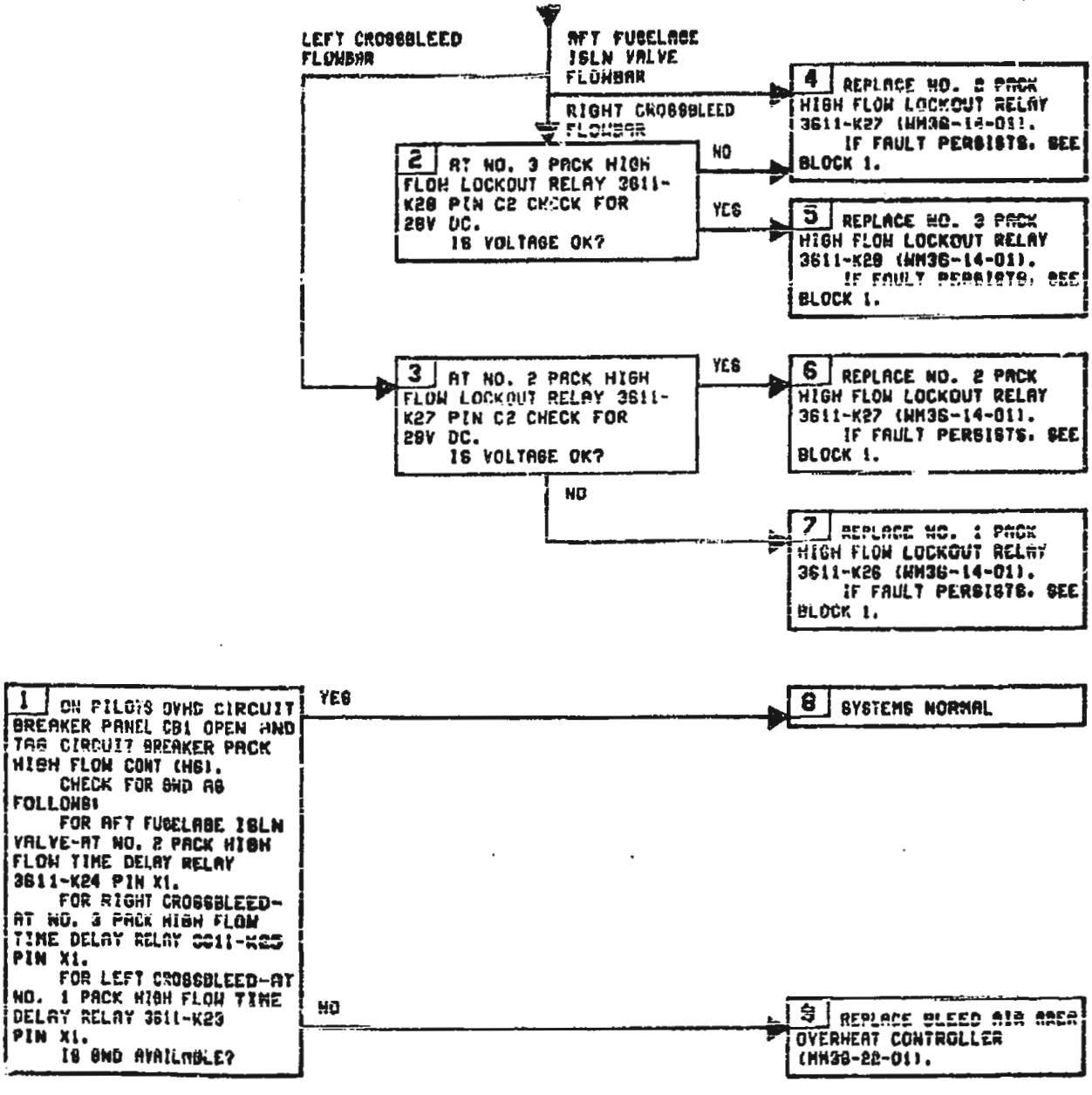
PREREQUISITES
ELECTRICAL POWER (WM24-00-00)
PNEUMATIC POWER (WM36-00-00)
CB'S IN: 1A16, 1B17, 1B18, 1H8


CONTINUED FROM SHEET 1
LEFT CROSSBLEED FLOWBAR
AFT FUSELAGE ISLN VALVE FLOWBAR
RIGHT CROSSBLEED FLOWBAR
4 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (WM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
2 AT NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
NO
YES
5 REPLACE NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 (WM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
3 AT NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
YES
6 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (WM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
NO
7 REPLACE NO. 1 PACK HIGH FLOW LOCKOUT RELAY 3611-K26 (WM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
1 ON PILOTS OVHD CIRCUIT BREAKER PANEL CB1 OPEN AND TAG CIRCUIT BREAKER PACK HIGH FLOW CONT (H6). CHECK FOR GND AS FOLLOWS: DEPRESS TEST SWITCH ON ASSOCIATED PACK AIR FLOW DIFFERENTIAL PRESSURE SWITCH. FOR AFT FUSELAGE ISLN VALVE-AT NO. 2 PACK HIGH FLOW TIME DELAY RELAY 3611-K24 PIN X1. FOR RIGHT CROSSBLEED-AT NO. 3 PACK HIGH FLOW TIME DELAY RELAY 3611-K25 PIN X1. FOR LEFT CROSSBLEED-AT NO. 1 PACK HIGH FLOW TIME DELAY RELAY 3611-K23 PIN X1. IS GND AVAILABLE?
NO
8 REPLACE ASSOCIATED AIR DIFFERENTIAL PRESSURE SWITCH (WM36-14-24).
YES
9 REPLACE RELAY (WM36-11-07).
M1-0001-36-393

R Aft Isolation Valve or Crossbleed Valve Faults
R Figure 103 (Sheet 2)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S (N): 1816, 1817, 1818, (N)

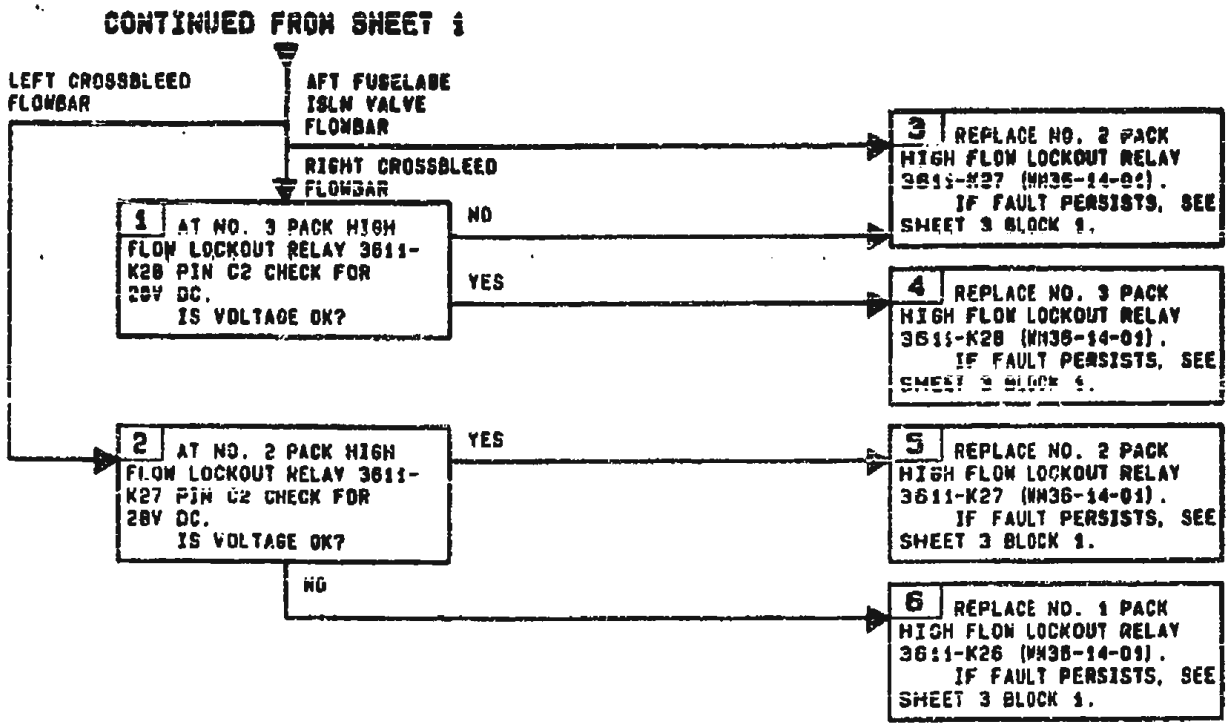
CONTINUED FROM SHEET 1


LEFT CROSSBLEED FLOWBAR
AFT FUSELAGE ISLN VALVE FLOWBAR
RIGHT CROSSBLEED FLOWBAR
2 AT NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
NO
YES
4 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
5 REPLACE NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 (MM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
3 AT NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
YES
NO
6 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
7 REPLACE NO. 1 PACK HIGH FLOW LOCKOUT RELAY 3611-K26 (MM36-14-01). IF FAULT PERSISTS, SEE BLOCK 1.
1 ON PILOTS OVHD CIRCUIT BREAKER PANEL CB1 OPEN AND TAG CIRCUIT BREAKER PACK HIGH FLOW CONT (HS). CHECK FOR GND AS FOLLOWS: FOR AFT FUSELAGE ISLN VALVE-AT NO. 2 PACK HIGH FLOW TIME DELAY RELAY 3611-K24 PIN X1. FOR RIGHT CROSSBLEED-AT NO. 3 PACK HIGH FLOW TIME DELAY RELAY 3611-K25 PIN X1. FOR LEFT CROSSBLEED-AT NO. 1 PACK HIGH FLOW TIME DELAY RELAY 3611-K23 PIN X1. IS GND AVAILABLE?
YES
NO
8 SYSTEMS NORMAL
9 REPLACE BLEED AIR AREA OVERHEAT CONTROLLER (MM36-22-01).

M1-0000-36-004

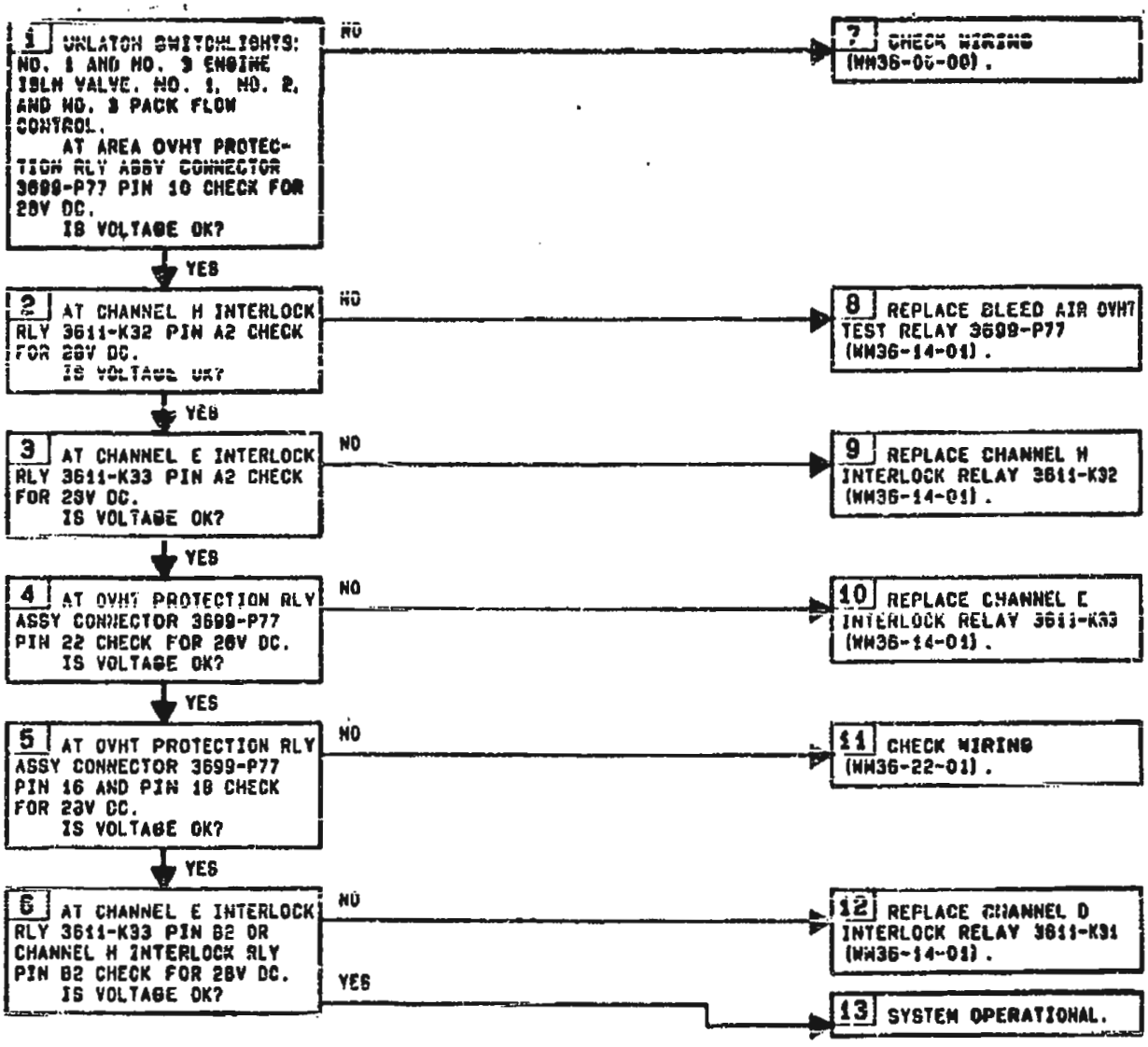
Aft Fuselage Valve or Crossbleed Valve Faults
Figure 103 (Sheet 2)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S IN: 1A16, 1B17, 1B18, 1H8


CONTINUED FROM SHEET 1
LEFT CROSSBLEED FLOWBAR
AFT FUSELAGE ISLN VALVE FLOWBAR
RIGHT CROSSBLEED FLOWBAR
1 AT NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
NO
YES
2 AT NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 PIN C2 CHECK FOR 28V DC. IS VOLTAGE OK?
YES
NO
3 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-01). IF FAULT PERSISTS, SEE SHEET 3 BLOCK 1.
4 REPLACE NO. 3 PACK HIGH FLOW LOCKOUT RELAY 3611-K28 (MM36-14-01). IF FAULT PERSISTS, SEE SHEET 3 BLOCK 1.
5 REPLACE NO. 2 PACK HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-01). IF FAULT PERSISTS, SEE SHEET 3 BLOCK 1.
6 REPLACE NO. 1 PACK HIGH FLOW LOCKOUT RELAY 3611-K26 (MM36-14-01). IF FAULT PERSISTS, SEE SHEET 3 BLOCK 1.

Aft Isolation Valve or Crossbleed Valve Faults
Figure 103 (Sheet 2)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S IN: 1B16, 1B17, 1B18, 1H9, 3W19


1 ISOLATION SWITCHLIGHTS: NO. 1 AND NO. 3 ENGINE ISLN VALVE, NO. 1, NO. 2, AND NO. 3 PACK FLOW CONTROL.
AT AREA OVHT PROTECTION RLY ASSY CONNECTOR 3699-P77 PIN 10 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
7 CHECK WIRING (MM36-00-00).
YES
2 AT CHANNEL H INTERLOCK RLY 3611-K32 PIN A2 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
8 REPLACE BLEED AIR OVHT TEST RELAY 3699-P77 (MM36-14-01).
YES
3 AT CHANNEL E INTERLOCK RLY 3611-K33 PIN A2 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
9 REPLACE CHANNEL H INTERLOCK RELAY 3611-K32 (MM36-14-01).
YES
4 AT OVHT PROTECTION RLY ASSY CONNECTOR 3699-P77 PIN 22 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
10 REPLACE CHANNEL E INTERLOCK RELAY 3611-K33 (MM36-14-01).
YES
5 AT OVHT PROTECTION RLY ASSY CONNECTOR 3699-P77 PIN 16 AND PIN 18 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
11 CHECK WIRING (MM36-22-01).
YES
6 AT CHANNEL E INTERLOCK RLY 3611-K33 PIN B2 OR CHANNEL H INTERLOCK RLY PIN B2 CHECK FOR 28V DC.
IS VOLTAGE OK?
NO
12 REPLACE CHANNEL D INTERLOCK RELAY 3611-K31 (MM36-14-01).
YES
13 SYSTEM OPERATIONAL.

M1-0001-38-1033

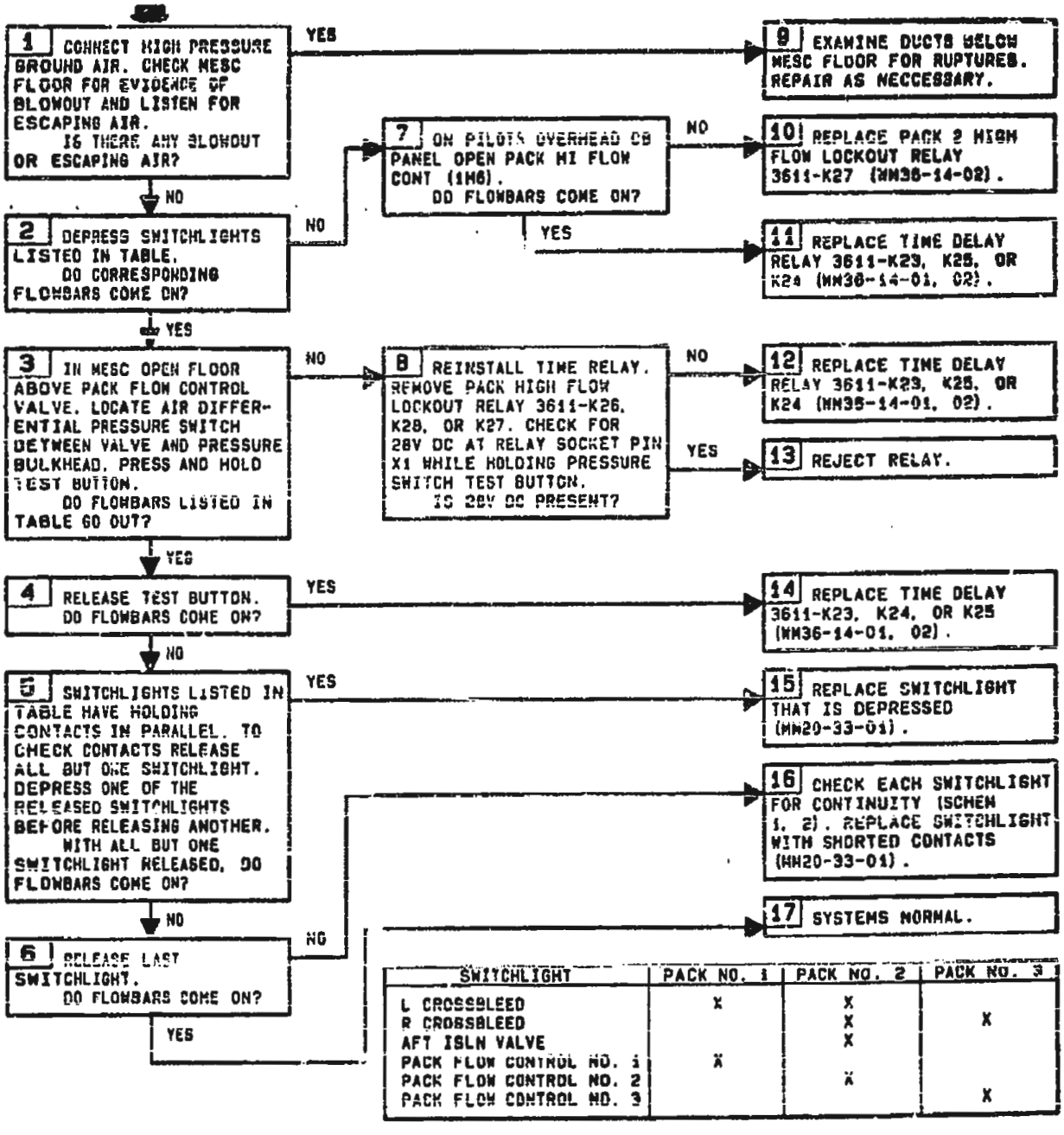
R Aft Isolation Valve or Crossbleed Valve Faults
R Figure 103 (Sheet 3)

EFFECTIVITY: 001-033 WITH SB21-214 AND
034-036 WITH SB21-216

001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S; 1B15, 1B17, 1B18, 1H8

PACK HIGH FLOW FAULT


1 CONNECT HIGH PRESSURE GROUND AIR. CHECK MESC FLOOR FOR EVIDENCE OF BLOWOUT AND LISTEN FOR ESCAPING AIR. IS THERE ANY BLOWOUT OR ESCAPING AIR?
YES
9 EXAMINE DUCTS BELOW MESC FLOOR FOR RUPTURES. REPAIR AS NECCESSARY.
NO
2 DEPRESS SWITCHLIGHTS LISTED IN TABLE. DO CORRESPONDING FLOWBARS COME ON?
NO
7 ON PILOTS OVERHEAD CB PANEL OPEN PACK HI FLOW CONT (1H6). DO FLOWBARS COME ON?
NO
10 REPLACE PACK 2 HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-02).
YES
11 REPLACE TIME DELAY RELAY 3611-K23, K25, OR K24 (MM36-14-01, 02).
YES
3 IN MESC OPEN FLOOR ABOVE PACK FLOW CONTROL VALVE. LOCATE AIR DIFFERENTIAL PRESSURE SWITCH DETWEEN VALVE AND PRESSURE BULKHEAD. PRESS AND HOLD TEST BUTTON. DO FLOWBARS LISTED IN TABLE GO OUT?
NO
8 REINSTALL TIME RELAY. REMOVE PACK HIGH FLOW LOCKOUT RELAY 3611-K26, K28, OR K27. CHECK FOR 28V DC AT RELAY SOCKET PIN X1 WHILE HOLDING PRESSURE SWITCH TEST BUTTON. IS 28V DC PRESENT?
NO
12 REPLACE TIME DELAY RELAY 3611-K23, K25, OR K24 (MM36-14-01, 02).
YES
13 REJECT RELAY.
YES
4 RELEASE TEST BUTTON. DO FLOWBARS COME ON?
YES
14 REPLACE TIME DELAY 3611-K23, K24, OR K25 (MM36-14-01, 02).
NO
5 SWITCHLIGHTS LISTED IN TABLE HAVE HOLDING CONTACTS IN PARALLEL. TO CHECK CONTACTS RELEASE ALL BUT ONE SWITCHLIGHT. DEPRESS ONE OF THE RELEASED SWITCHLIGHTS BEFORE RELEASING ANOTHER. WITH ALL BUT ONE SWITCHLIGHT RELEASED, DO FLOWBARS COME ON?
YES
15 REPLACE SWITCHLIGHT THAT IS DEPRESSED (MM20-33-01).
16 CHECK EACH SWITCHLIGHT FOR CONTINUITY (SCHEM 1, 2). REPLACE SWITCHLIGHT WITH SHORTED CONTACTS (MM20-33-01).
NO
6 RELEASE LAST SWITCHLIGHT. DO FLOWBARS COME ON?
NO
17 SYSTEMS NORMAL.
YES

SWITCHLIGHT	PACK NO. 1	PACK NO. 2	PACK NO. 3
L CROSSBLEED	X	X	
R CROSSBLEED		X	X
AFT ISLN VALVE		X	
PACK FLOW CONTROL NO. 1	X		
PACK FLOW CONTROL NO. 2		X	
PACK FLOW CONTROL NO. 3			X

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R
R

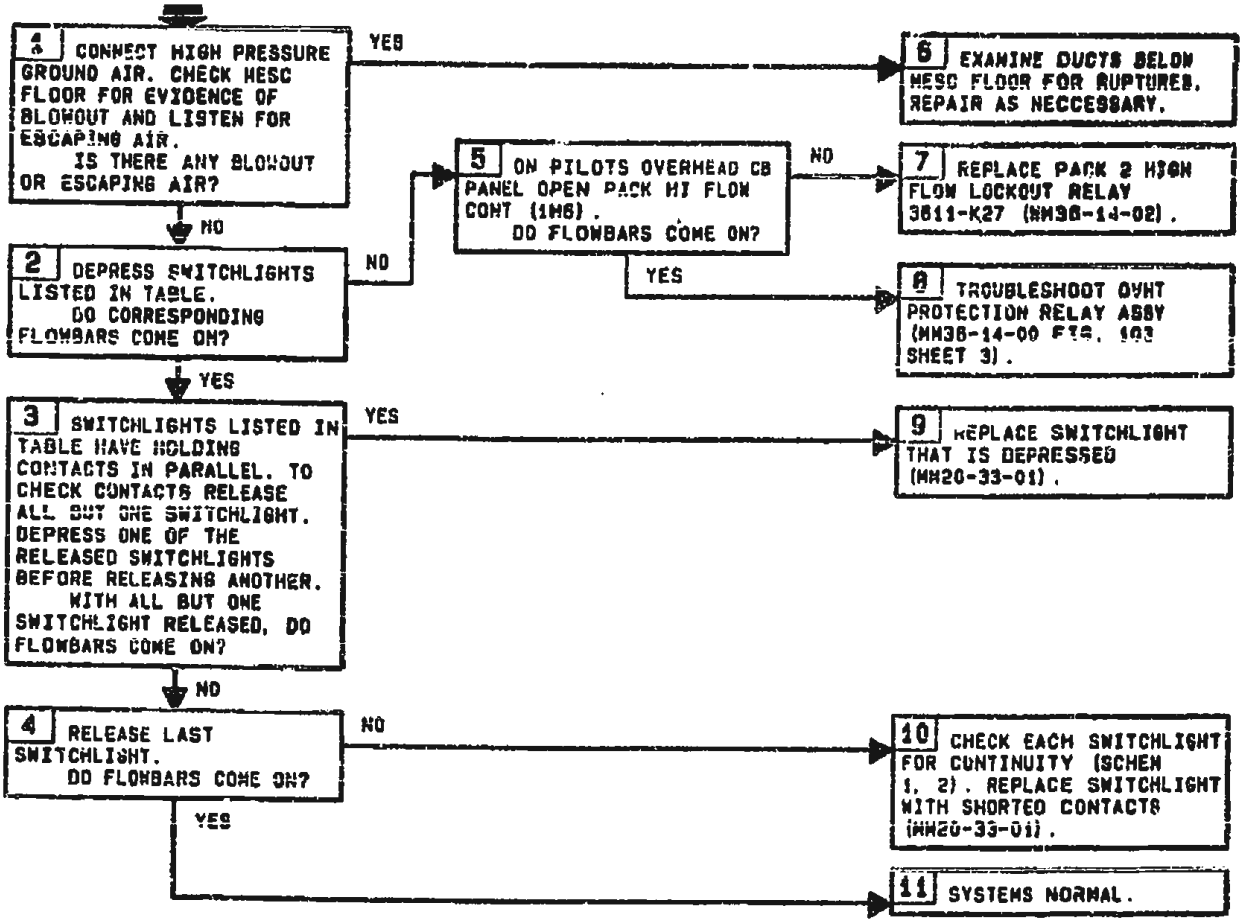
Pack High Flow Fault
Figure 104

EFFECTIVITY: 001-033 WITHOUT SB21-214, AND
034-036 WITHOUT SB21-216

0018

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: 1616, 1617, 1618, IN8

PACK HIGH FLOW FAULT


1 CONNECT HIGH PRESSURE GROUND AIR. CHECK MESC FLOOR FOR EVIDENCE OF BLOWOUT AND LISTEN FOR ESCAPING AIR. IS THERE ANY BLOWOUT OR ESCAPING AIR?
YES
6 EXAMINE DUCTS BELOW MESC FLOOR FOR RUPTURES. REPAIR AS NECCESSARY.
NO
2 DEPRESS SWITCHLIGHTS LISTED IN TABLE. DO CORRESPONDING FLOWBARS COME ON?
NO
5 ON PILOTS OVERHEAD CB PANEL OPEN PACK HI FLOW CONT (1M6). DO FLOWBARS COME ON?
NO
7 REPLACE PACK 2 HIGH FLOW LOCKOUT RELAY 3611-K27 (MM36-14-02).
YES
8 TROUBLESHOOT OVHT PROTECTION RELAY ASSY (MM36-14-00 FIG. 103 SHEET 3).
YES
3 SWITCHLIGHTS LISTED IN TABLE HAVE HOLDING CONTACTS IN PARALLEL. TO CHECK CONTACTS RELEASE ALL BUT ONE SWITCHLIGHT. DEPRESS ONE OF THE RELEASED SWITCHLIGHTS BEFORE RELEASING ANOTHER. WITH ALL BUT ONE SWITCHLIGHT RELEASED, DO FLOWBARS COME ON?
YES
9 REPLACE SWITCHLIGHT THAT IS DEPRESSED (MM20-33-01).
NO
4 RELEASE LAST SWITCHLIGHT. DO FLOWBARS COME ON?
NO
10 CHECK EACH SWITCHLIGHT FOR CONTINUITY (SCHEM 1, 2). REPLACE SWITCHLIGHT WITH SHORTED CONTACTS (MM20-33-01).
YES
11 SYSTEMS NORMAL.

SWITCHLIGHT	PACK NO. 1	PACK NO. 2	PACK NO. 3
L CROSSBLEED	X	X	
R CROSSBLEED		X	X
AFT ISLN VALVE		X	
PACK FLOW CONTROL NO. 1	X		
PACK FLOW CONTROL NO. 2		X	
PACK FLOW CONTROL NO. 3			X

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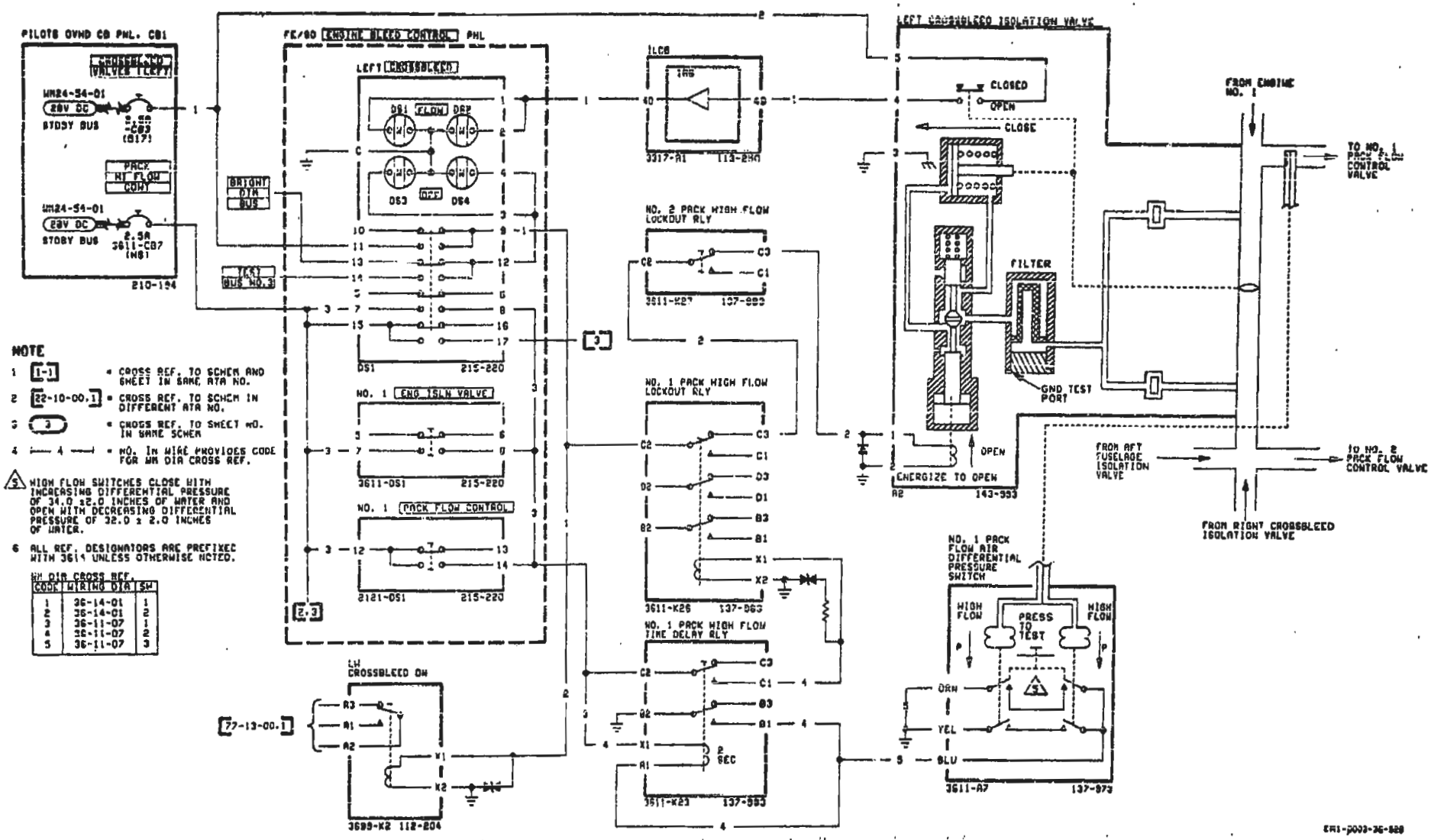
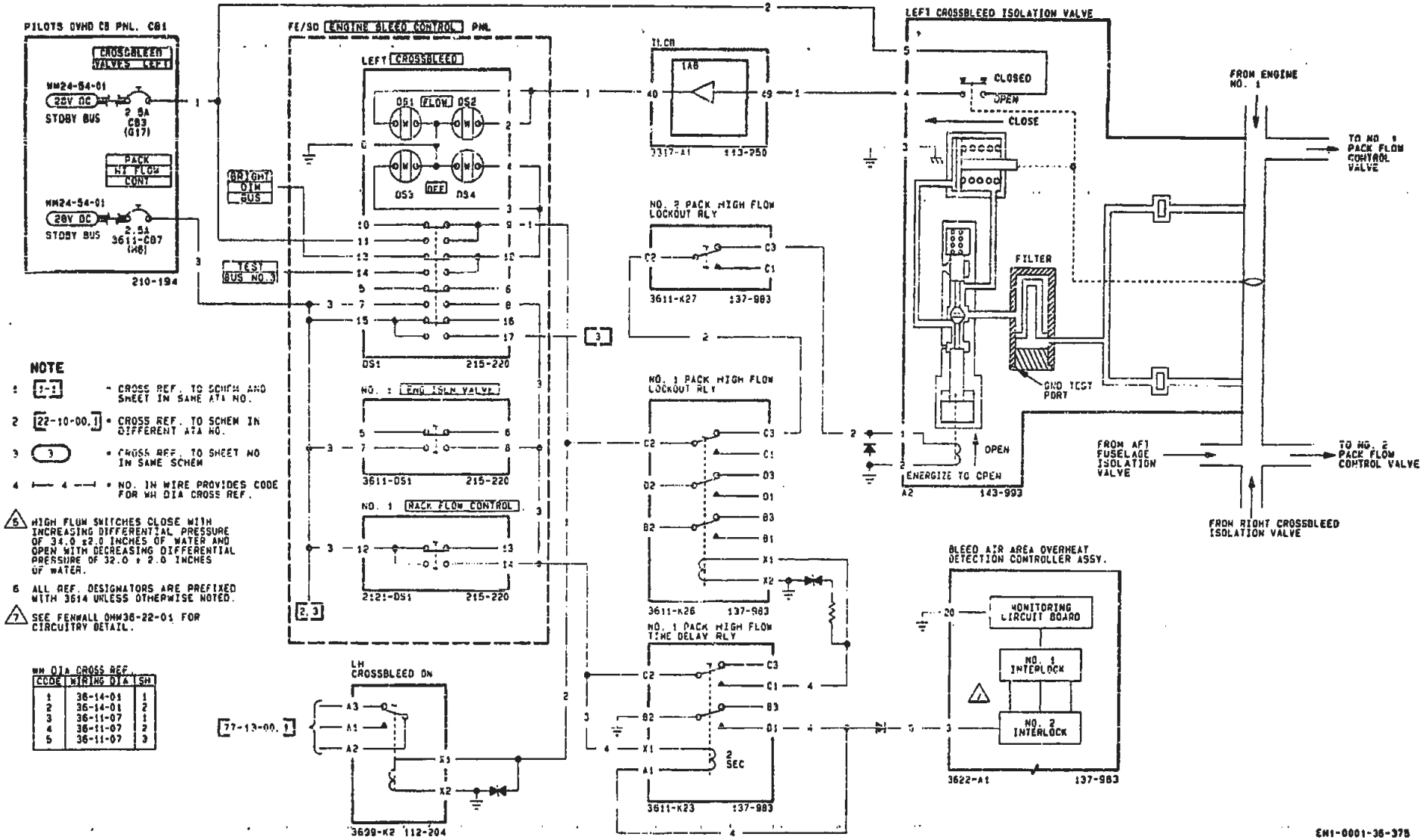
R
R

Pack High Flow Faults
Figure 104


PILOTS OVHD CB PNL, CB1
FE/60 ENGINE BLEED CONTROL PNL
LEFT CROSSBLEED
FLOW
OFF
DS1
DS3
DS4
BRIGHT DYN BUS
ISIS BUS NO.3
NO. 1 ENG ISLN VALVE
NO. 1 PACK FLOW CONTROL
LCB
NO. 2 PACK HIGH FLOW LOCKOUT RLY
NO. 1 PACK HIGH FLOW LOCKOUT RLY
NO. 1 PACK HIGH FLOW TIME DELAY RLY
LH CROSSBLEED ON
LEFT CROSSBLEED ISOLATION VALVE
CLOSED
OPEN
CLOSE
FILTER
GND TEST PORT
ENERGIZE TO OPEN
FROM ENGINE NO. 1
TO NO. 1 PACK FLOW CONTROL VALVE
FROM AFT FUSELAGE ISOLATION VALVE
TO NO. 2 PACK FLOW CONTROL VALVE
FROM RIGHT CROSSBLEED ISOLATION VALVE
NO. 1 PACK FLOW AIR DIFFERENTIAL PRESSURE SWITCH
HIGH FLOW
PRESS TO TEST
ORN
YEL
BLU
2 SEC
STDBY BUS
28V DC
PACK HI FLOW CONT
NOTE
1 [1-1] * CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2 [22-10-00.1] * CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3 [3] * CROSS REF. TO SHEET NO. IN SAME SCHEM
4 — 4 — * NO. IN WIRE PROVIDES CODE FOR WH DIA CROSS REF.
5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSURE OF 34.0 ±2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.
6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3611 UNLESS OTHERWISE NOTED.
WH DIA CROSS REF.
CODE WIRING DIA SH
1 36-14-01 1
2 36-14-01 2
3 36-11-07 1
4 36-11-07 2
5 36-11-07 3

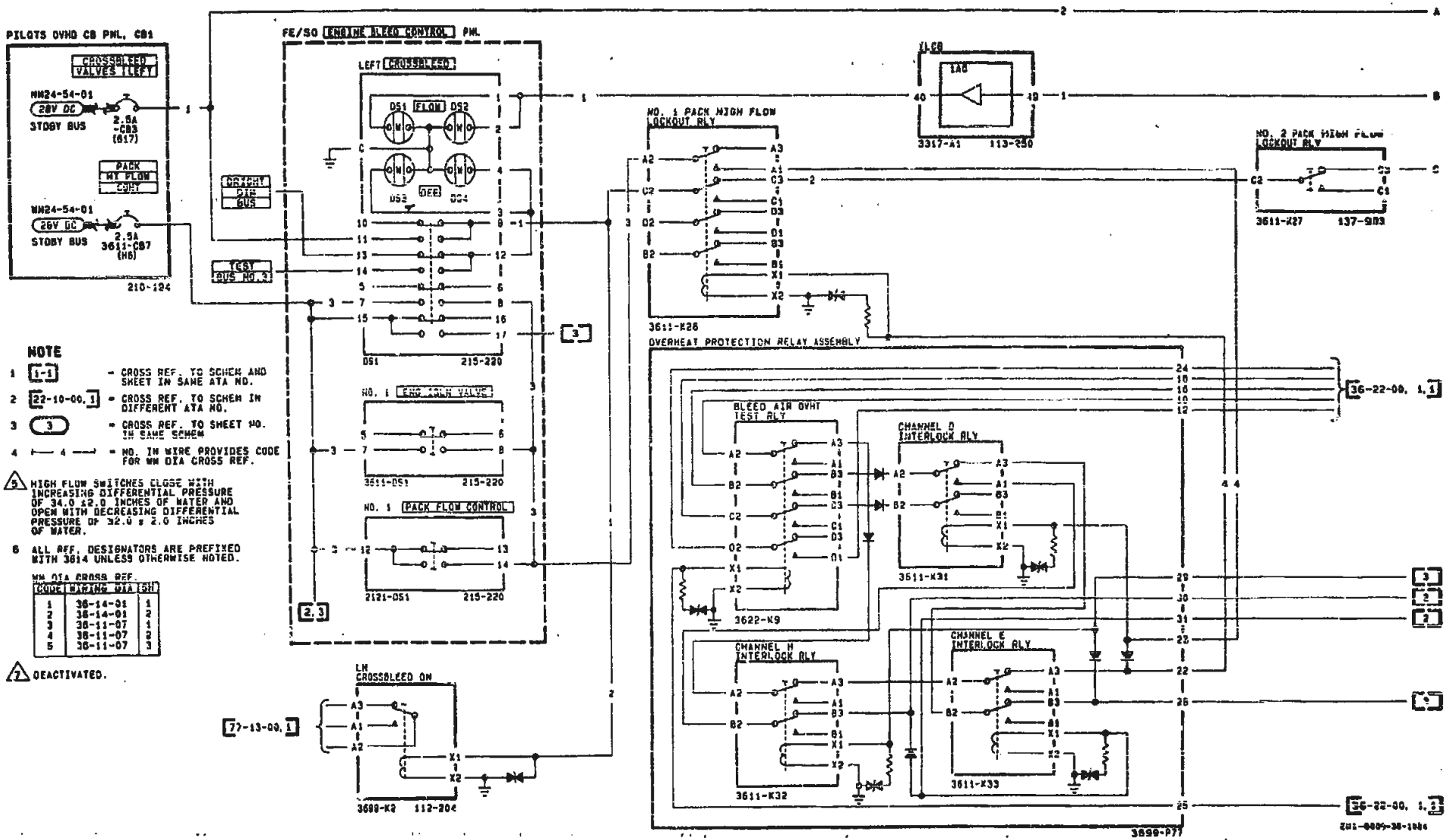
Left Crossbleed Valve System Schematic
SCHEM 1

R EFFECTIVITY: 001-033 WITHOUT SB21-214
R
001B



Left Crossbleed Valve System Schematic
SCHEM 1

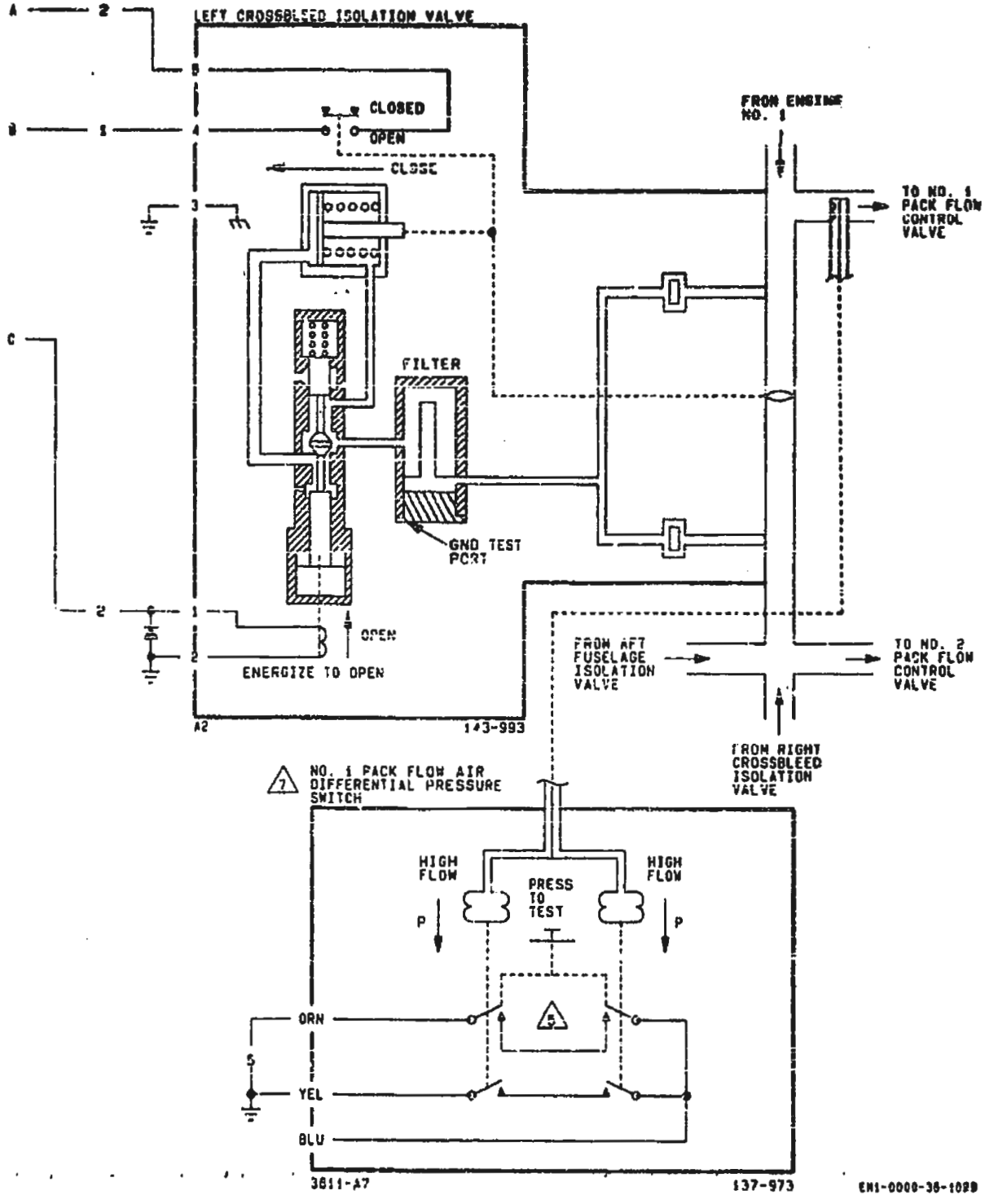
R EFFECTIVITY: 034-999 WITHOUT SB21-216
R
0018



R Left Crossbleed Valve System Schematic
R SCHEM 1 (Sheet 1)

EFFECTIVITY: 001-033 WITH SB21-214 AND
034-036 WITH SB21-216

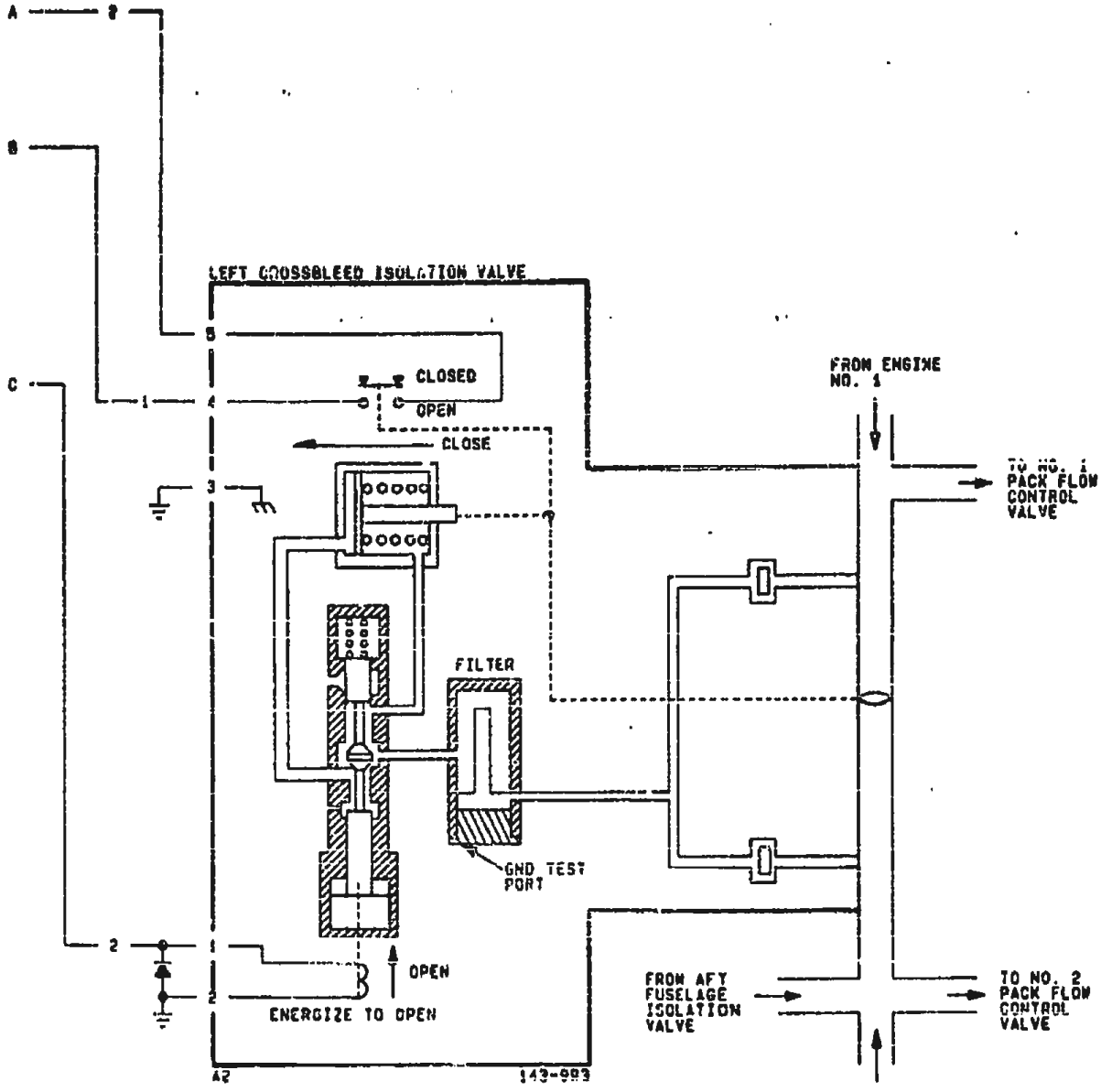
001B



Left Crossbleed Valve System Schematic
SCHEM 1 (Sheet 2)

EFFECTIVITY: 001-033 WITH SB21-214

001B



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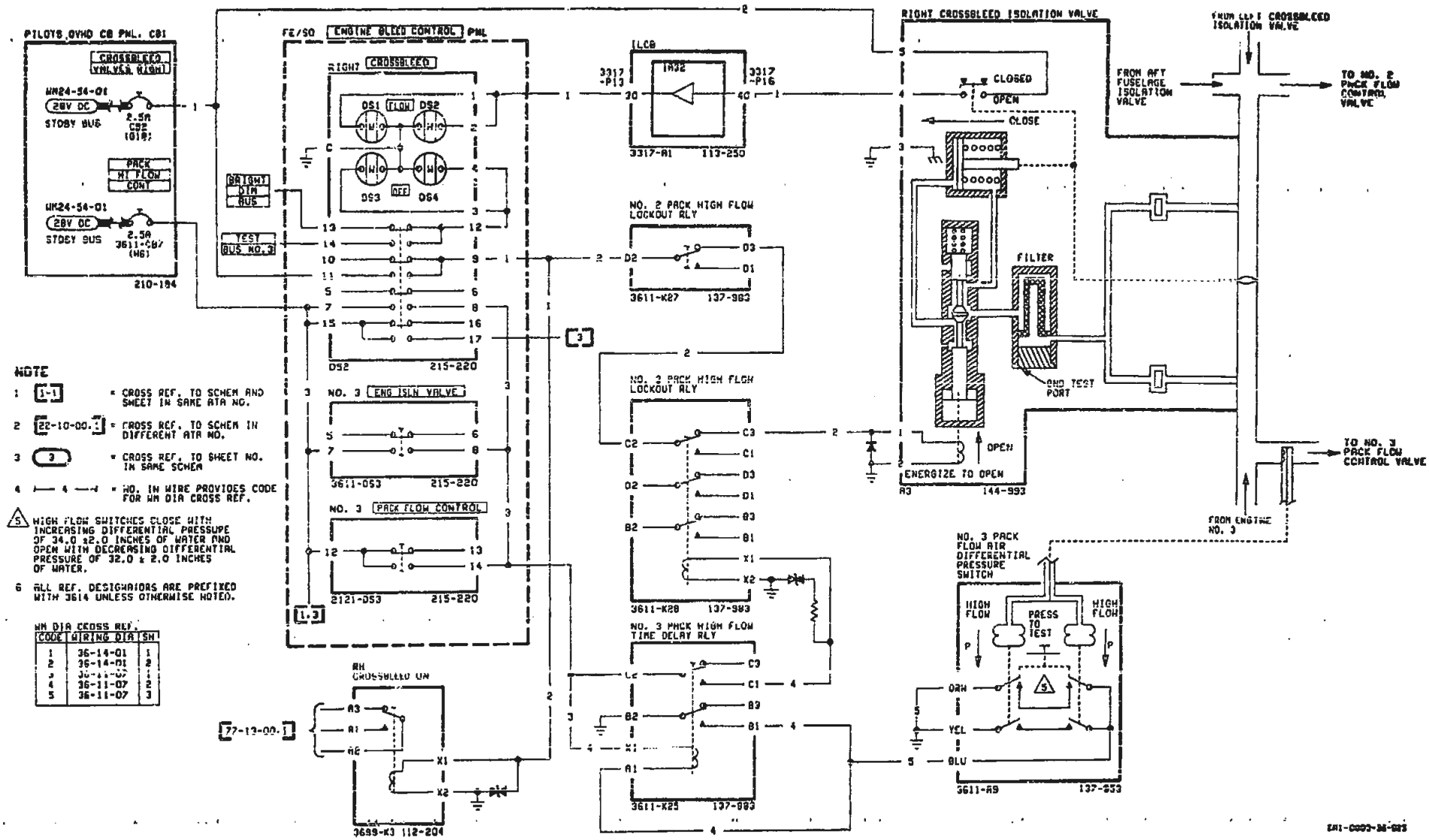
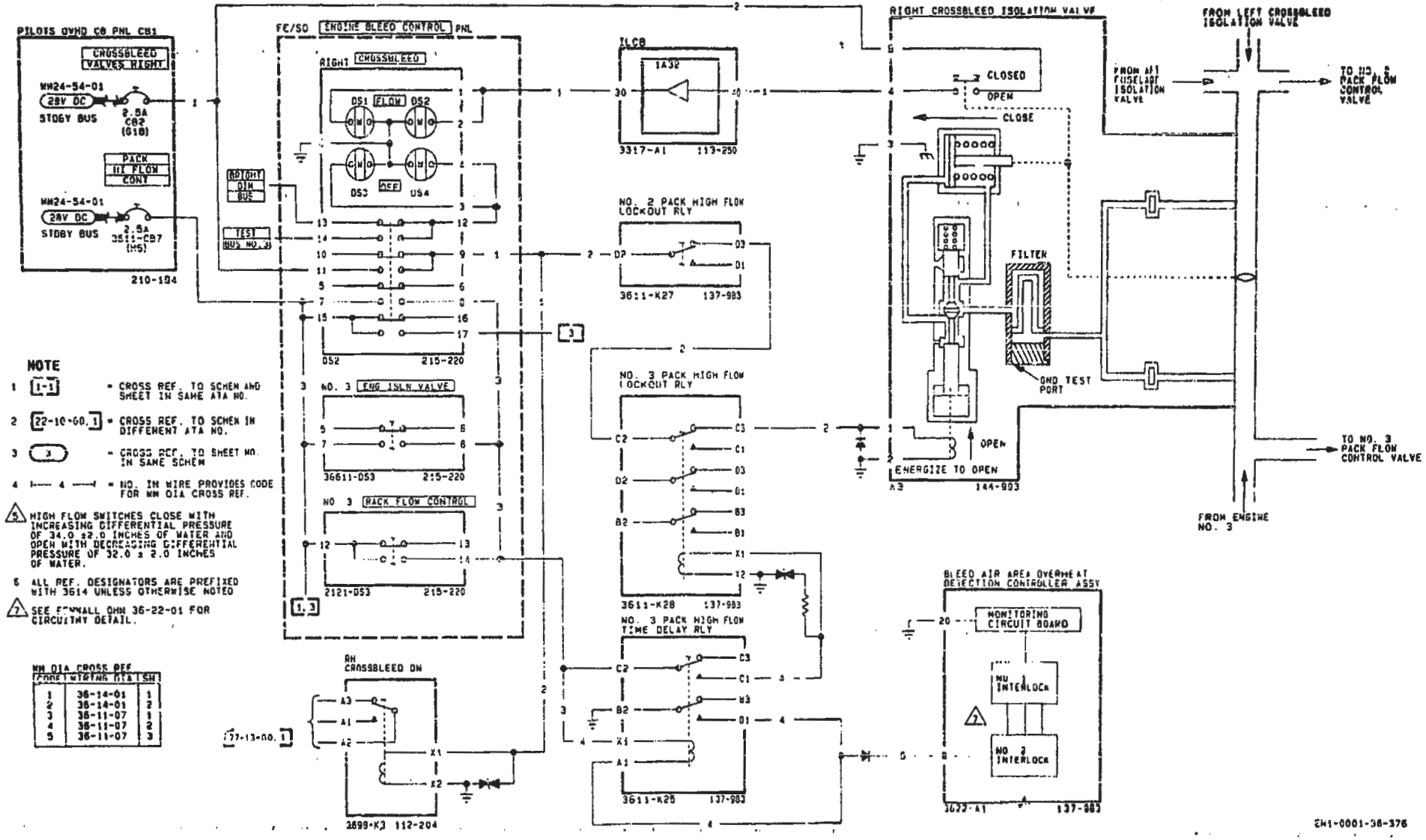
R Left Crossbleed Valve System Schematic
R SCHEM 1 (Sheet 2)

R EFFECTIVITY: 034-036 WITH SB21-216


PILOTS OVHD CB PNL. C81
CROSSBLEED VALVES RIGHT
WM24-54-01
28V DC
STDBY BUS
2.5A CB2 (G19)
PACK HI FLOW CONT
WM24-54-01
28V DC
STDBY BUS
2.5A 3611-C87 (W61)
210-184
FE/SO ENGINE BLEED CONTROL PNL
RIGHT CROSSBLEED
OS1 FLOW OS2
OS3 OFF OS4
RIGHT SIM BUS
TEST BUS NO.3
OS2 215-220
NO. 3 ENG ISLN VALVE
3611-053 215-220
NO. 3 PACK FLOW CONTROL
2121-053 215-220
LCB
3317 -P13
3317 -P16
IM32
3317-A1 113-250
NO. 2 PACK HIGH FLOW LOCKOUT RLY
3611-K27 137-983
NO. 3 PACK HIGH FLOW LOCKOUT RLY
3611-K28 137-983
NO. 3 PACK HIGH FLOW TIME DELAY RLY
3611-K25 137-983
RH CROSSBLEED VA
3699-K3 112-204
RIGHT CROSSBLEED ISOLATION VALVE
CLOSED
OPEN
CLOSE
FILTER
GND TEST PORT
OPEN
ENERGIZE TO OPEN
A3 144-993
FROM AFT FUSELAGE ISOLATION VALVE
FROM LEFT CROSSBLEED ISOLATION VALVE
TO NO. 2 PACK FLOW CONTROL VALVE
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 3
NO. 3 PACK FLOW AIR DIFFERENTIAL PRESSURE SWITCH
HIGH FLOW
PRESS TO TEST
HIGH FLOW
ORN
YEL
BLU
3611-A9 137-853
NOTE
1 [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2 [22-10-00.1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3 (3) = CROSS REF. TO SHEET NO. IN SAME SCHEM
4 = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSUPE OF 34.0 ±2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.
6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3614 UNLESS OTHERWISE NOTED.
WM DIA CROSS REF.
CODE | W/RING DIA | SH
1 | 36-14-01 | 1
2 | 36-14-01 | 2
3 | 36-11-07 | 1
4 | 36-11-07 | 2
5 | 36-11-07 | 3

Right Crossbleed System Schematic
SCHEM 2

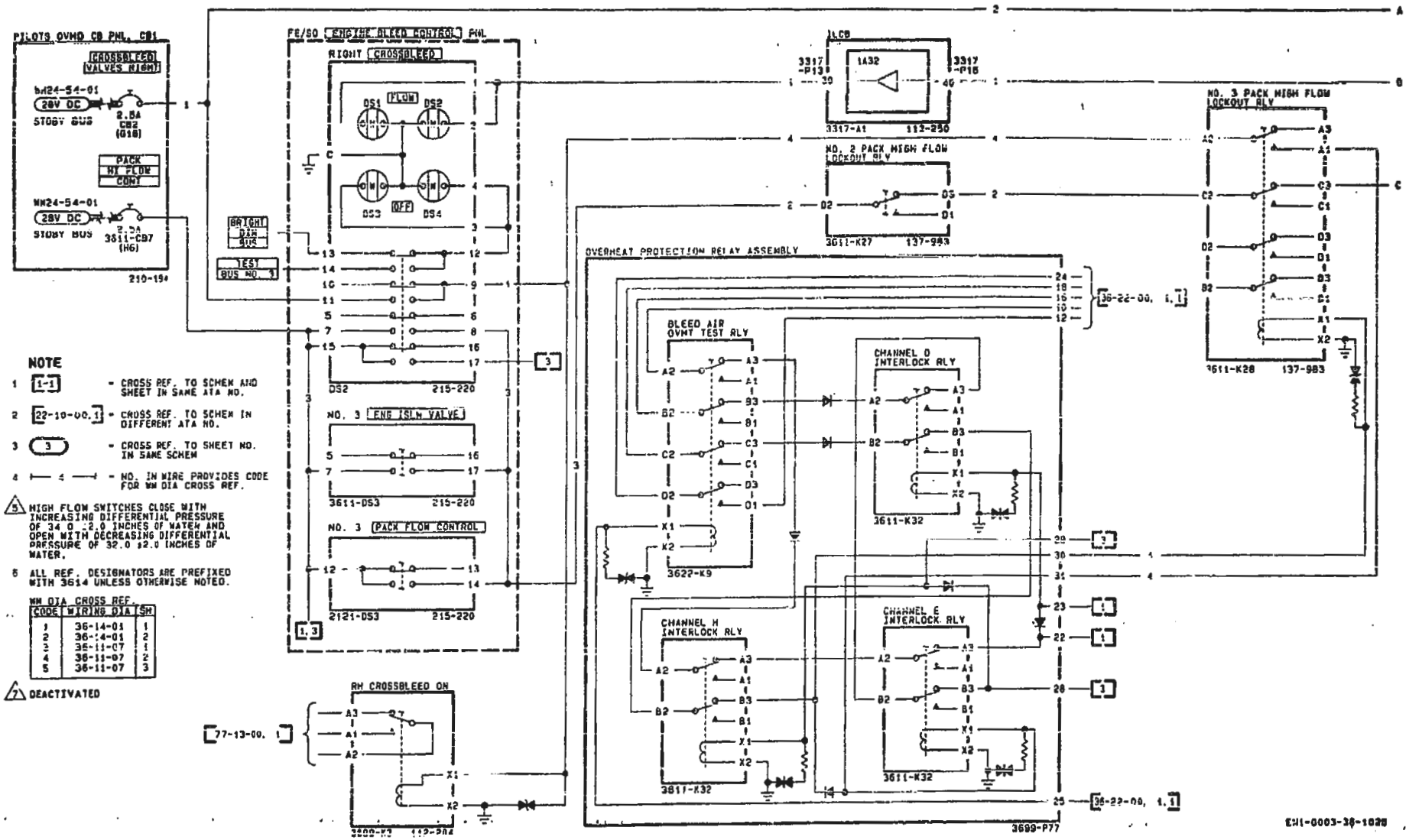
R EFFECTIVITY: 001-033 WITHOUT SB21-214
R
001B


PILOTS OVHD CB PNL CB1
CROSSBLEED VALVES RIGHT
WM24-54-01
28V DC
STDBY BUS
2.5A CB2 (G18)
PACK HI FLOW CONT
WM24-54-01
28V DC
STDBY BUS
2.5A 3611-CB7 (H5)
210-194
FE/SO ENGINE BLEED CONTROL PNL
RIGHT CROSSBLEED
DS1 FLOW DS2
DS3 REF DS4
RIGHT DIM BUS
TEST BUS NO.3
DS2 215-220
NO. 3 ENG ISLN VALVE
36611-DS3 215-220
NO 3 PACK FLOW CONTROL
2121-DS3 215-220
1,3
ILCB
1A32
3317-A1 113-250
NO. 2 PACK HIGH FLOW LOCKOUT RLY
3611-K27 137-983
NO. 3 PACK HIGH FLOW LOCKOUT RLY
3611-K28 137-983
NO. 3 PACK HIGH FLOW TIME DELAY RLY
3611-K25 137-983
RH CROSSBLEED DN
3699-K3 112-204
RIGHT CROSSBLEED ISOLATION VALVE
CLOSED
OPEN
CLOSE
FILTER
GND TEST PORT
OPEN
ENERGIZE TO OPEN
A3 144-993
FROM LEFT CROSSBLEED ISOLATION VALVE
FROM APU FUSELAGE ISOLATION VALVE
TO NO. 2 PACK FLOW CONTROL VALVE
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 3
BLEED AIR AREA OVERHEAT DETECTION CONTROLLER ASSY
MONITORING CIRCUIT BOARD
NO 2 INTERLOCK
NO 3 INTERLOCK
3629-A1 137-983
NOTE
1 [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2 [22-10-00,1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3 [3] = CROSS REF. TO SHEET NO. IN SAME SCHEM
4 4 = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSURE OF 34.0 ±2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.
6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3614 UNLESS OTHERWISE NOTED
7 SEE FSWALL DHM 36-22-01 FOR CIRCUITRY DETAIL.
WM DIA CROSS REF
CODE WIRING DIA SH
1 36-14-01 1
2 36-14-01 2
3 36-11-07 1
4 36-11-07 2
5 36-11-07 3
[22-13-00,1]
EW1-0001-36-376

R Right Crossbleed Valve System Schematic
R SCHEM 2

EFFECTIVITY: 034-999 WITHOUT SB21-216

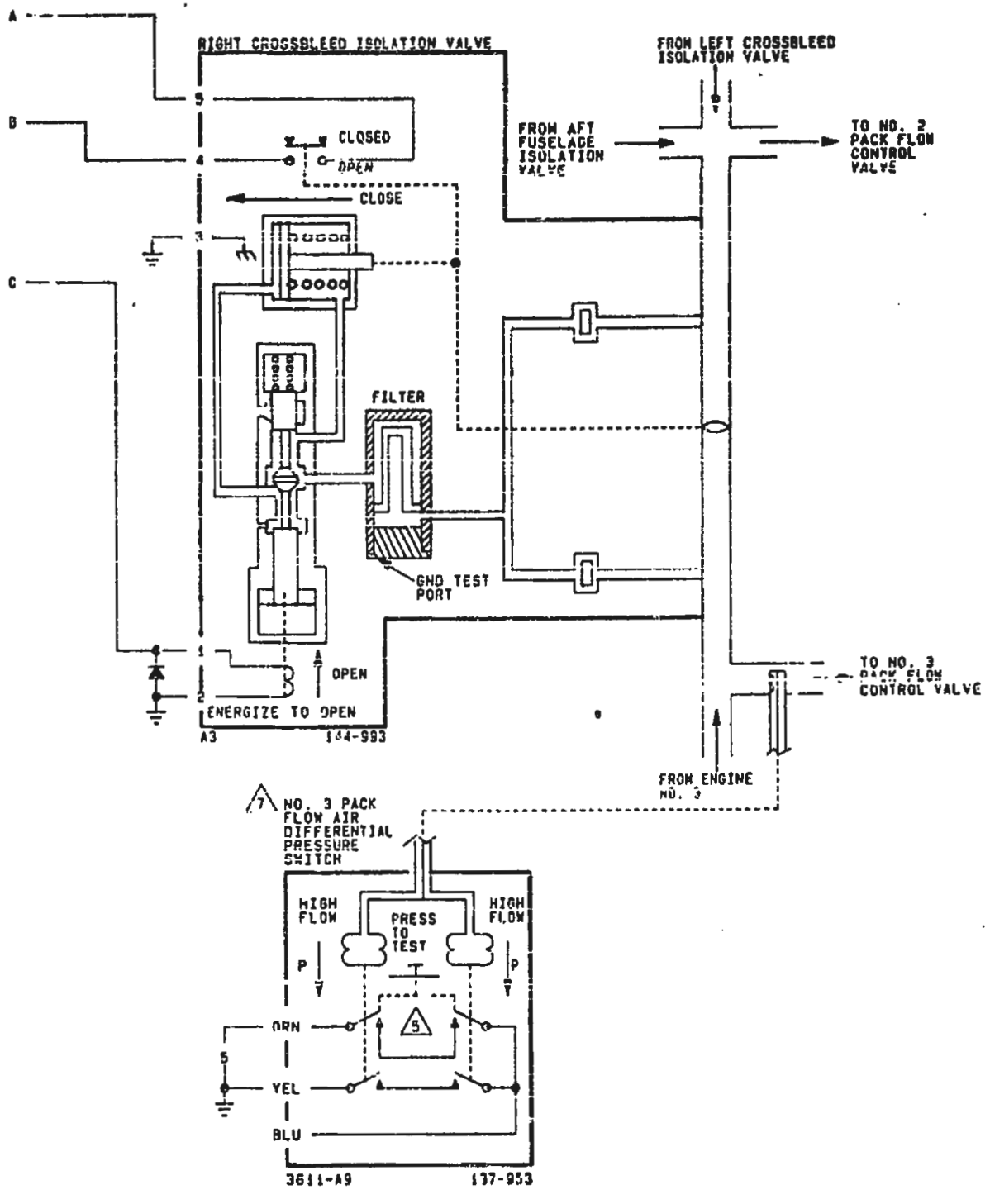
001B



R Right Crossbleed Valve System Schematic
R SCHEM 2 (Sheet 1)

EFFECTIVITY: 001-033 WITH SB21-214 AND
034-036 WITH SB21-216

001B



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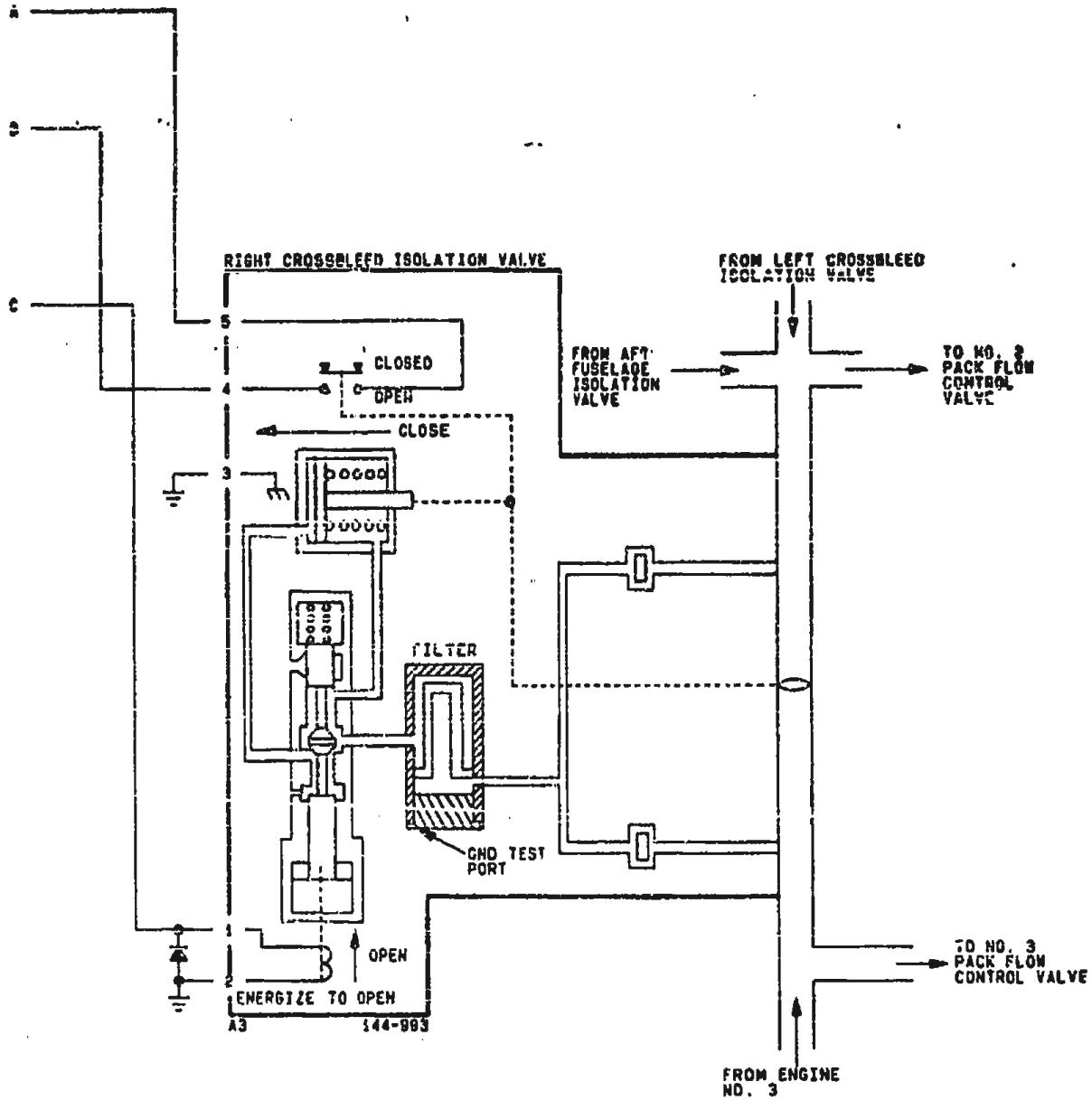
R
R

Right Crossbleed Valve System Schematic
SCHEM 2 (Sheet 2)

EFFECTIVITY: 001-033 WITH SB21-214

001B



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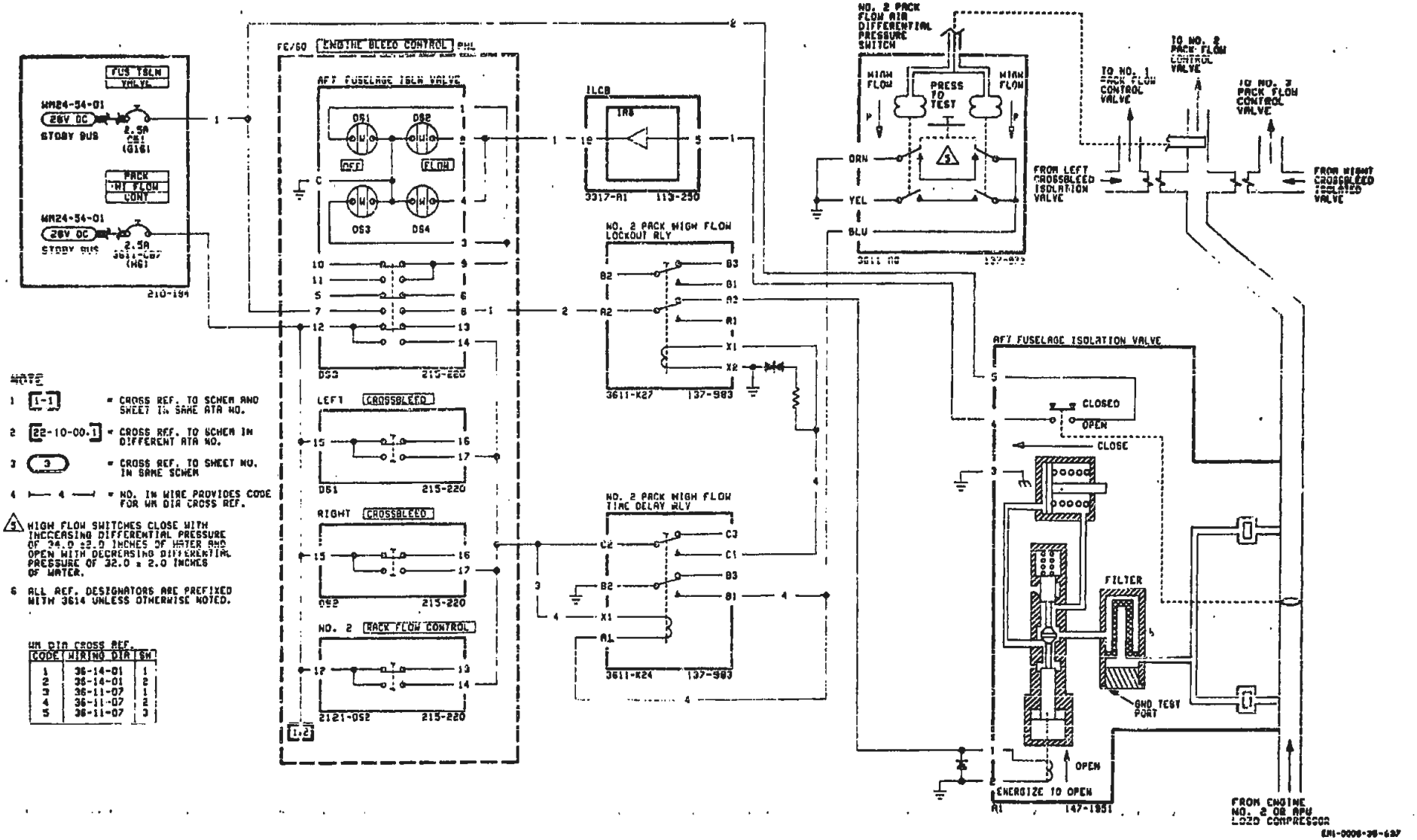
R Right Crossbleed Valve System Schematic
R SCHEM 2 (Sheet 2)

EFFECTIVITY: 034-036 WITH SB21-216



NOTE

1 [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.

2 [22-10-00.1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.

3 (3) = CROSS REF. TO SHEET NO. IN SAME SCHEM

4 —4— = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.

5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSURE OF 34.0 ±2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.

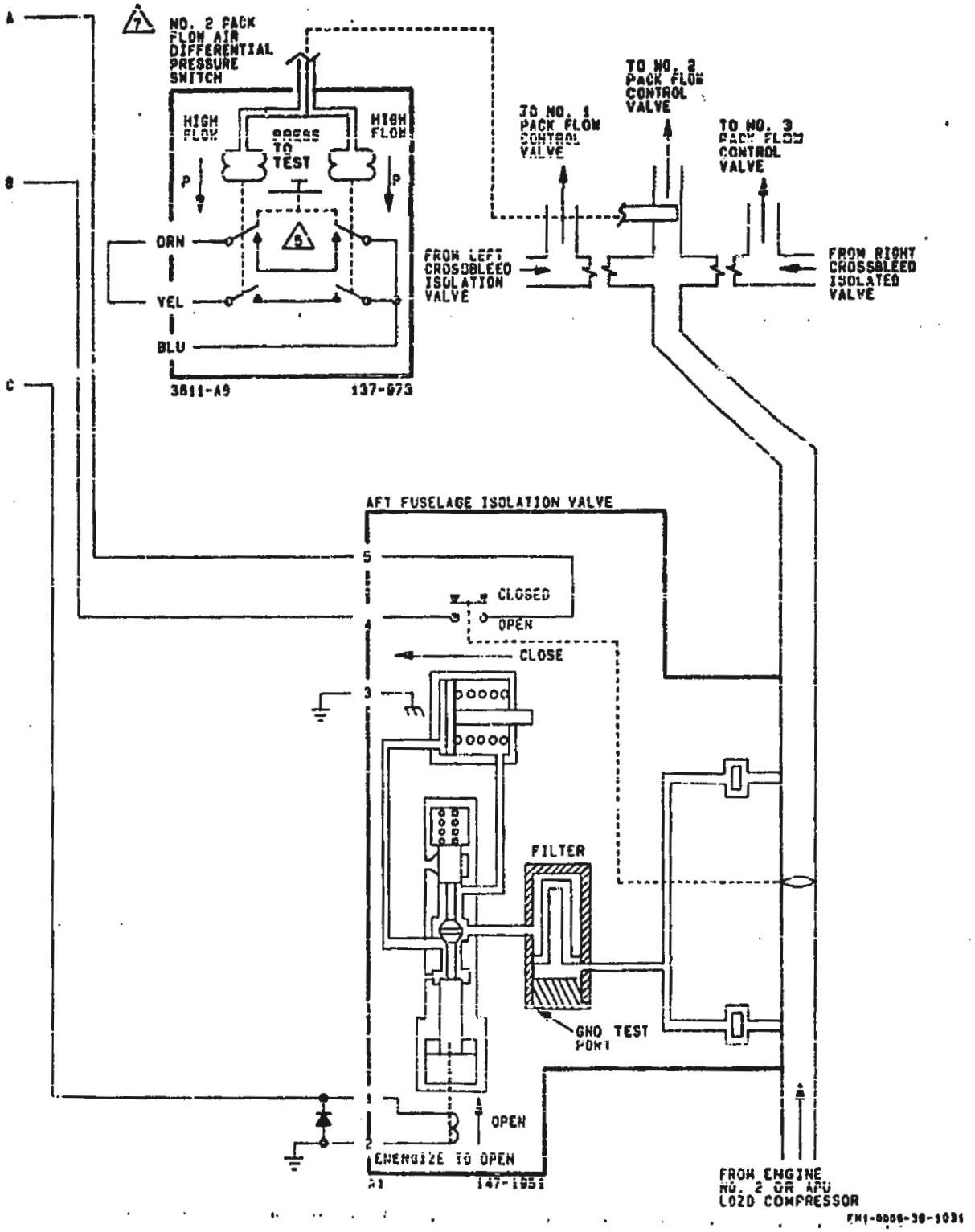
6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3614 UNLESS OTHERWISE NOTED.

WM DIA CROSS REF.

CODE	WIRING DIA	SH
1	36-14-01	1
2	36-14-01	2
3	36-11-07	1
4	36-11-07	2
5	36-11-07	3

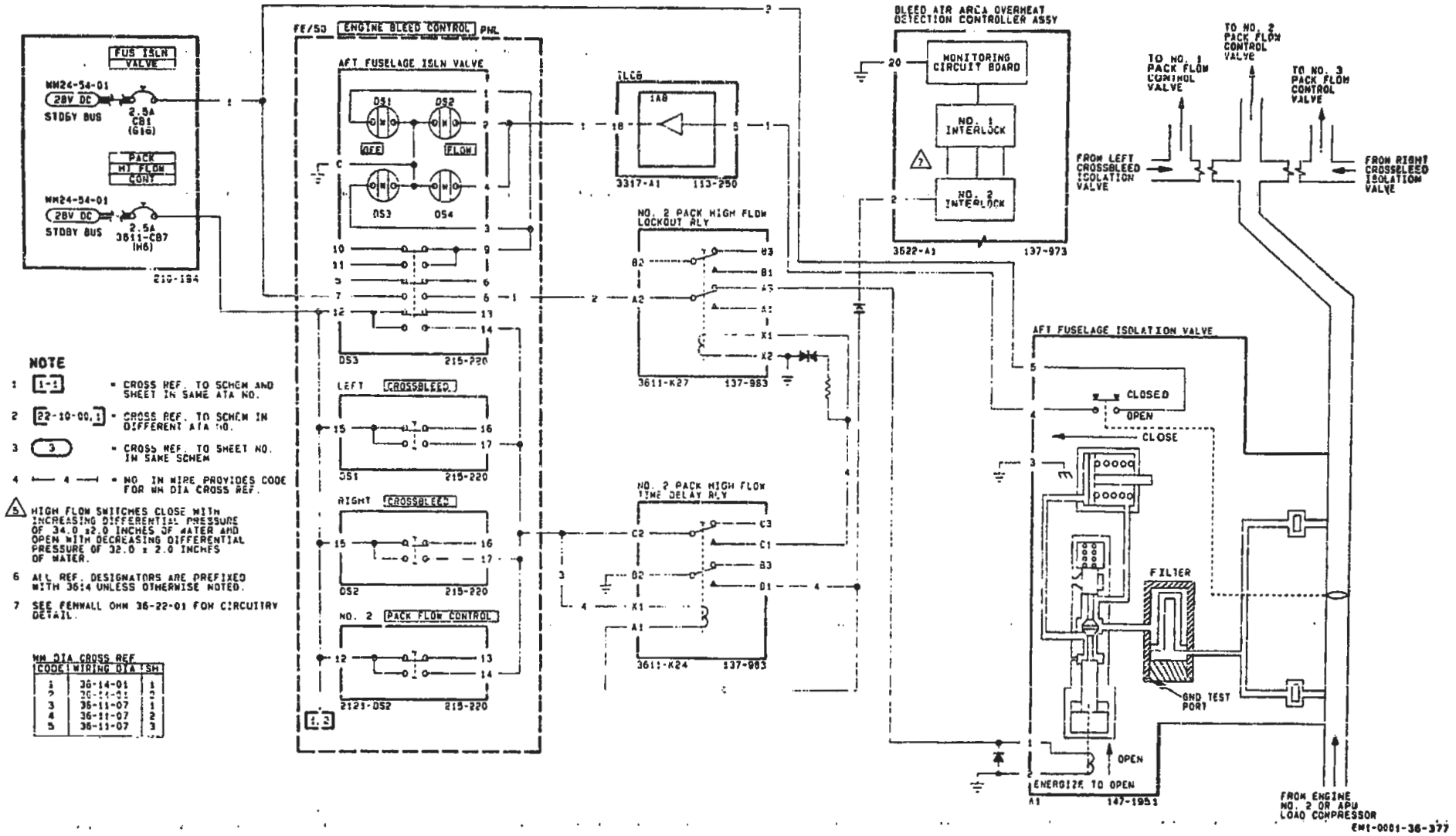
Aft Fuselage Isolation Valve System Schematic
SCHEM 3

R EFFECTIVITY: 001-033 WITHOUT SB21-214
R
0018



R Aft Fuselage Isolation Valve System Schematic
R SCHEM 3 (Sheet 2)

EFFECTIVITY: 001-033 WITH SB21-214



NOTE

1 [1-1] - CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.

2 [22-10-00,1] - CROSS REF. TO SCHEM IN DIFFERENT ATA NO.

3 (3) - CROSS REF. TO SHEET NO. IN SAME SCHEM

4 —4— - NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.

5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSURE OF 34.0 ±2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.

6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3614 UNLESS OTHERWISE NOTED.

7 SEE FENWALL OHM 36-22-01 FOR CIRCUITRY DETAIL.

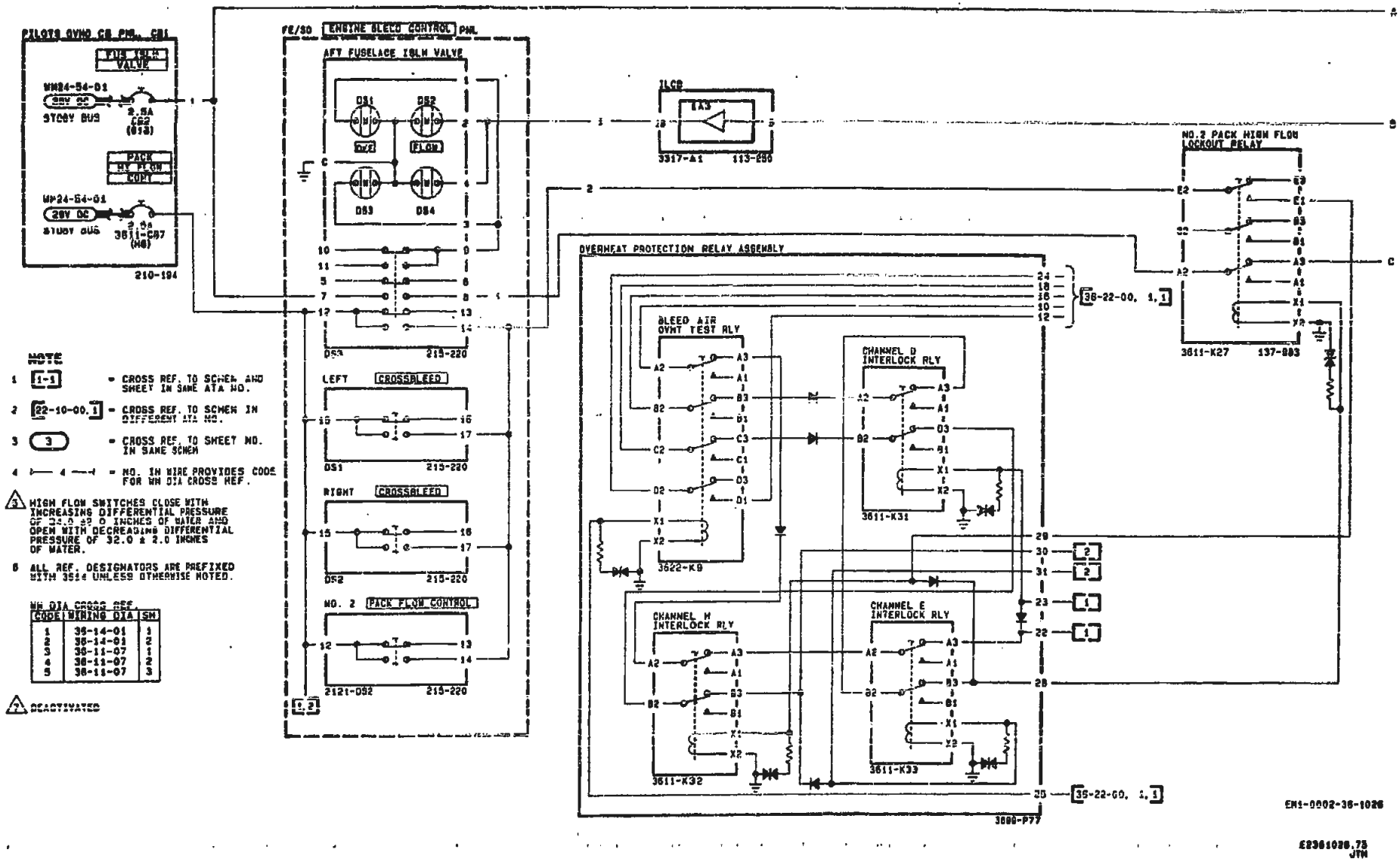
WM DIA CROSS REF

CODE	WIRING DIA	ISH
1	36-14-01	1
2	36-14-01	2
3	36-11-07	1
4	36-11-07	2
5	36-11-07	3

R R Aft Fuselage Isolation Valve System Schematic
SCHEM 3

R EFFECTIVITY: 034-999 WITHOUT SB21-216

001B



NOTE

1 [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.

2 [22-10-00, 1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.

3 (3) = CROSS REF. TO SHEET NO. IN SAME SCHEM

4 ⊢ 4 ⊣ = NO. IN WIRE PROVIDES CODE FOR WH DIA CROSS REF.

5 HIGH FLOW SWITCHES CLOSE WITH INCREASING DIFFERENTIAL PRESSURE OF 34.0 ± 2.0 INCHES OF WATER AND OPEN WITH DECREASING DIFFERENTIAL PRESSURE OF 32.0 ± 2.0 INCHES OF WATER.

6 ALL REF. DESIGNATORS ARE PREFIXED WITH 3514 UNLESS OTHERWISE NOTED.

WH DIA CROSS REF

CODE	WIRING DIA	SH
1	36-14-01	1
2	36-14-01	2
3	36-11-07	1
4	36-11-07	2
5	36-11-07	3

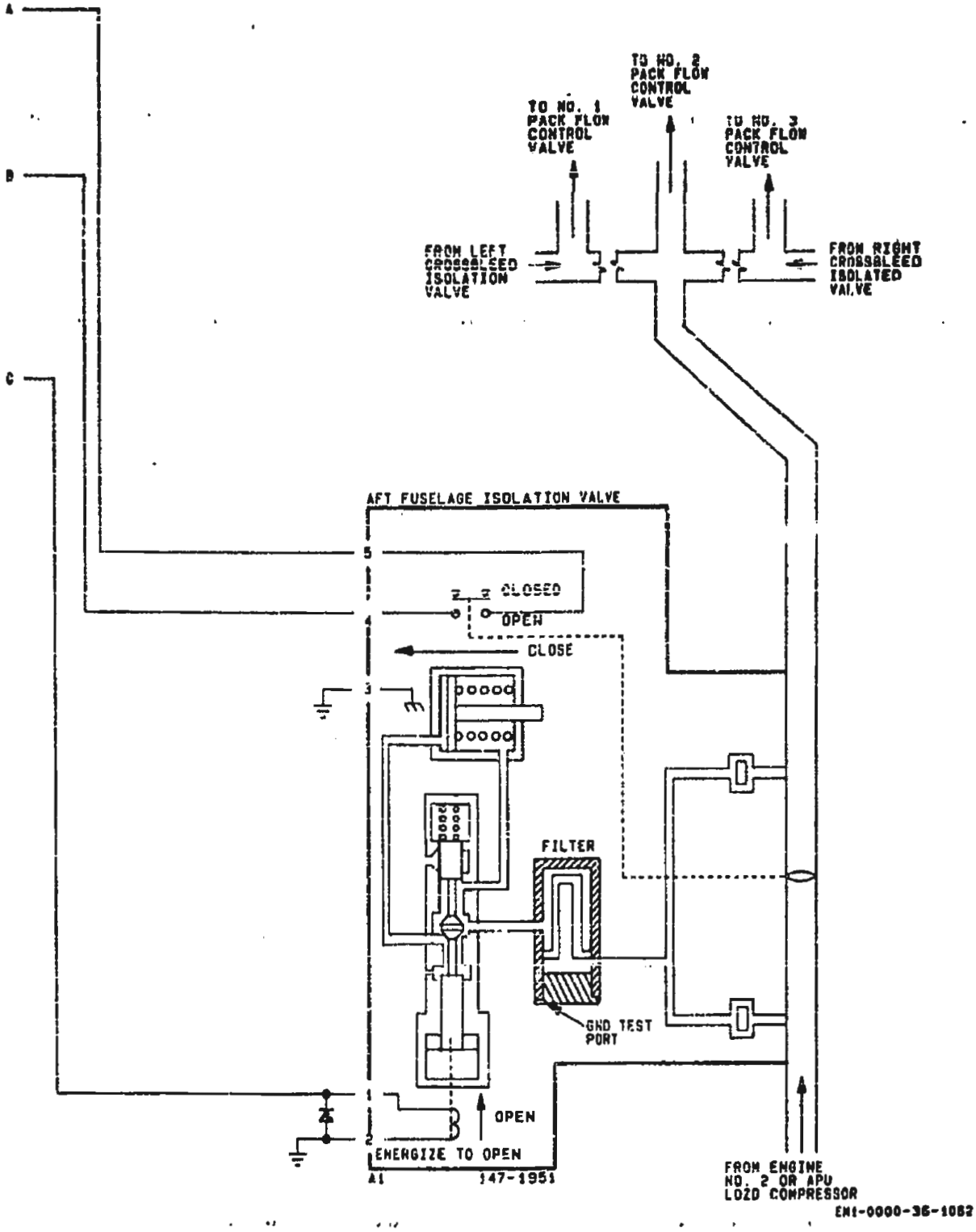
7 DEACTIVATED

R
R

Aft Fuselage Isolation Valve System Schematic
SCHEM 3 (Sheet 1)

EFFECTIVITY: 001-033 WITH SB21-214,
034-036 WITH SB21-216

001B



R Aft Fuselage Isolation Valve System Schematic
R SCHEM 3 (Sheet 2)

EFFECTIVITY: 034-036 WITH SB21-216

AFT FUSELAGE DUCT ISOLATION VALVE - MAINTENANCE PRACTICES

1. General

The aft fuselage duct isolation valve is a butterfly type valve used to isolate pneumatic ducting aft of the hydraulic service center from the rest of the pneumatic system. It is located in the aft, lower left corner of the hydraulic service center.

2. Maintenance Practices

A. Deactivation

R NOTE: If No. 2 engine isolation valve and both crossbleed
R valves are operative, secure the aft fuselage
R isolation valve in the open position.

R Deactivate the Aft Fuselage Isolation Valve in the
R same position in which it failed, i.e. if the valve
R failed in the open mode, deactivate the valve in the
R open mode.

R Engine 1, 2 and 3 Isolation Valves and both
R Crossbleed Valves must be operative, reference MM
R 36-11-18 and 36-14-02.

R If the Aft Fuselage Isolation Valve is secured in the
R closed position, verify that A and B Area Overhead
R Detection System Loops for Areas H and J are
R operative by performing a preflight check on this
R item.

(1) Open hydraulic service center access panel 147BB.

(2) In aft left corner of hydraulic service center, remove manual position lock pin (3/8-inch hex) from isolation valve.

(3) Use 1/2-inch wrench on manual override hex and position indicator to open or close isolation valve as necessary.

R (4) When valve position indicator is at full OPEN or CLOSED
R position, install lock pin, long end first, and tighten.

(5) Use wrench on override hex to verify valve is locked in position.

(6) Install access panel opened in Step 2A(1).

(7) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, zone 215, placard ISLN VALVE switchlight AFT
R ISOLATION VALVE SECURED OPEN (or CLOSED).

(8) Make appropriate entry in aircraft log book.

AFT FUSELAGE DUCT ISOLATION VALVE - REMOVAL AND INSTALLATION

R 1. General

R The aft fuselage duct isolation valve is located in the aft,
R lower left corner of hydraulic service center, zone 140 (Ref.
R Fig. 401).

R 2. Equipment and Materials

R Air Filter, Aft fuselage isolation valve

R Filter - Parker Hannifin P/N 2691075

R Performed Packing - Parker Hannifin P/N 2661058R015

R Grease - Dow Corning No. 33 or equivalent

R Tool - Preformed Packing Applicator - Parker Hannifin P/N
R H80-0-114-3 or equivalent

R Lockwire - MS20995N20, 0.020-inch diameter, or equivalent

R 3. Referenced Procedure

20-36-01 Single T-bolt V-band Coupling - Removal and Installation

R 4. Removal/Installation - Aft Fuselage Duct Isolation Valve

A. Removal

R (1) Placard Flight Engineer/Second Officers (FE/SO) bleed
R air and APU control panels and the three high-pressure
R ground air connections to prevent operation until
R completion of procedures.

R (2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - FUS ISLN VALVE (G16).

R (3) Remove access panel 147BB (Ref. Fig. 401).

R WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL
R REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH
R SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE
R USED WHEN REQUIRED.

(4) Remove electrical connector.

(5) Remove single T-bolt V-band couplings (Ref. 20-36-01) securing valve flanges to Y-duct and elbow duct.

(6) Remove bolts, washers, and nuts securing valve bracket to valve positioning clip.

(7) Remove aft fuselage duct isolation valve.

(8) Install protective covers on ducts.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

(3) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(4) Position isolation valve between duct ends.

(5) Attach valve bracket to valve positioning clip with bolt, washers and nut.

(6) Secure isolation valve to Y-duct and elbow duct with single T-bolt V-band couplings (Ref. 20-36-01).

R (7) Install electrical connector.

R (8) Install access panel.

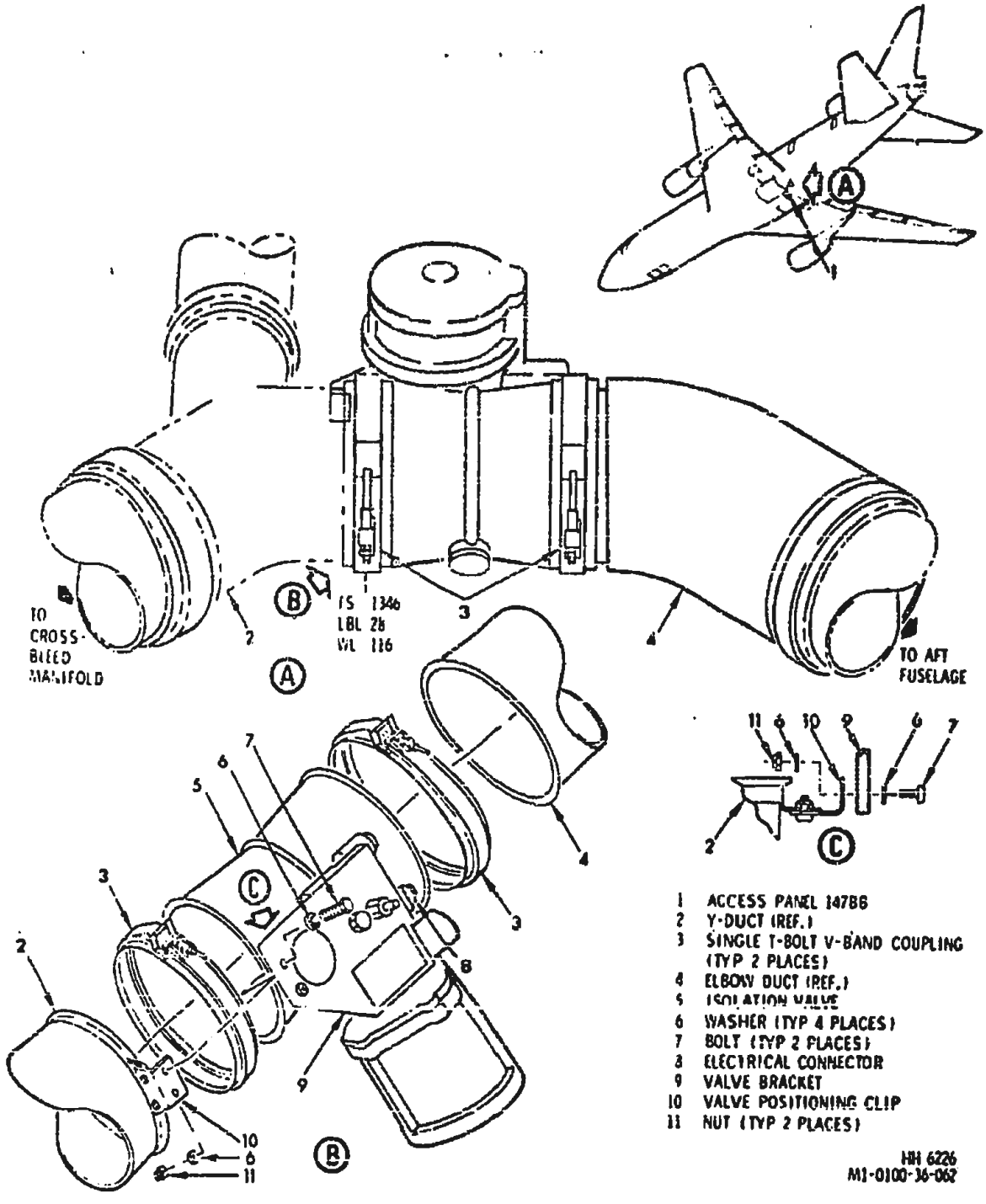
R (9) Remove tag and close circuit breaker opened in Step
R 4A(2).

R (10) Remove placards installed in Step 4A(1).

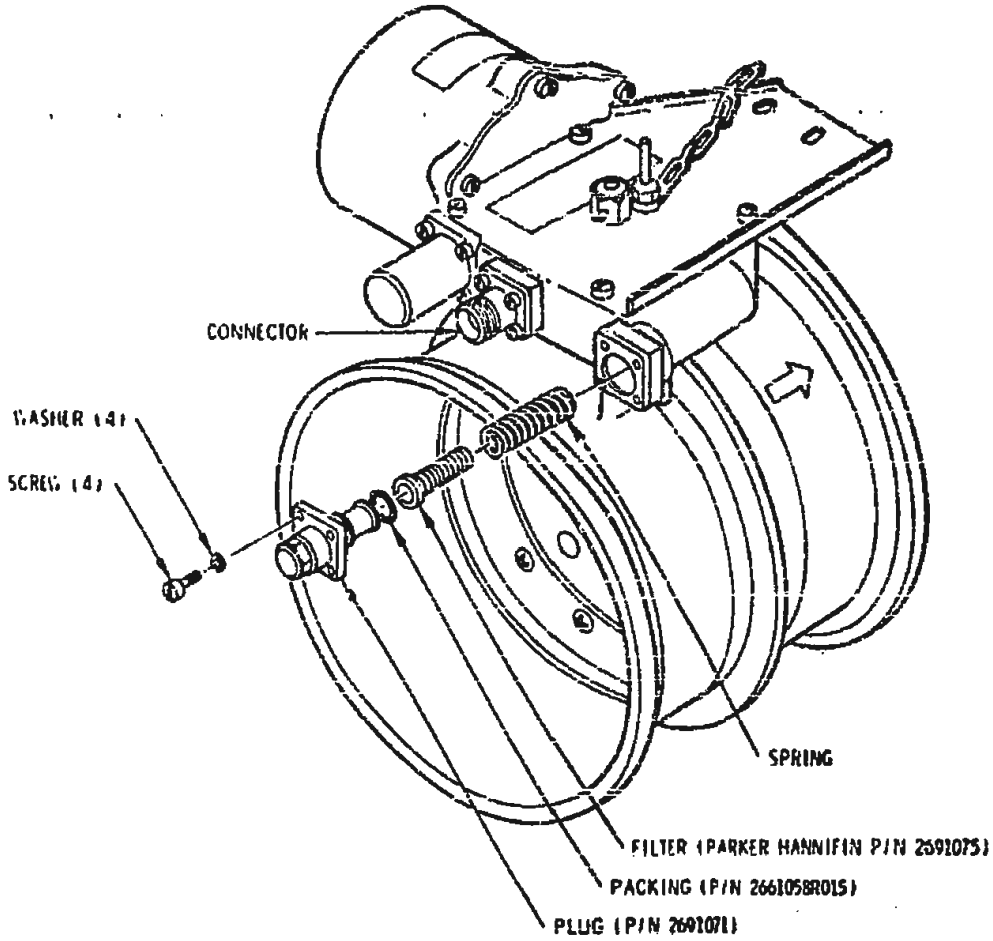
5. Removal/Installation - Air Filter

A. Removal

(1) Placard Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.



Aft Fuselage Duct Isolation Valve - Removal and Installation
Figure 401



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R Aft Fuselage Isolation Valve Air Filter
R Removal and Installation
R Figure 402

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker FUS ISLN VALVE (G16).

(3) Open access door 1478B (Ref. Fig. 401).

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Remove lockwire between filter plug and connector.

(5) Remove screws (4) and washers (4) from plug - Parker Hannifin P/N 2691071 (Ref. Fig. 402). Remove spring and filter from housing. Separate packing from plug and discard packing.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Assemble packing (Parker Hannifin P/N 2661058R015) on plug (Parker Hannifin P/N 2691071) using preformed packing applicator.

(3) Install spring, filter and plug (Parker Hannifin P/N 2691071) with packing into filter housing (Ref. Fig. 402).

(4) Apply Dow Corning No. 33 grease to screws and washers and assemble through plug (Parker Hannifin P/N 2691071) into housing.

(5) Lockwire plug with screws on connector

(6) Install access panel.

(7) Remove tag and close circuit breaker opened in Step 5A(2).

(8) Remove placards installed in Step 5A(1).

AFT FUSELAGE DUCT ISOLATION VALVE ADJUSTMENT AND TEST

1. General

Field adjustment of the Aft Fuselage duct isolation valve is not recommended.

2. Equipment and Materials

Valve Tester, Hamilton Standard GS9400-7, or equivalent

Test Plug, Hamilton Standard GS14123-1, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

O-ring (Ref. Fig. 501)

3. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
49-00-00	Auxiliary Power Unit - Maintenance Practices

4. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) On Flight Engineer/Second Officers circuit breaker panel CB1, zone 210, verify that circuit breaker FUS ISLN VALVE (G16) is closed.

(3) Turn on auxiliary power unit (Ref. 49-00-00).

(4) On Flight Engineer/Second Officers BLEED CONTROL panel, zone 215, depress ISLN VALVE switchlight. Verify that flowbar is on.

(5) Release ISLN VALVE switchlight. Verify that flowbar is off.

(6) Turn off auxiliary power unit (Ref. 49-00-00).

R (7) Return circuit breaker and switchlight to pretest R positions.

R B. Functional Test

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND R APU CONTROL PANELS AND THE THREE HIGH-PRESSURE R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL R COMPLETION OF TEST PROCEDURES. RECENT OPERATION R OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE R PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM R TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED R WHEN REQUIRED.

R (1) Open hydraulic service center access panel 147BB.

R (2) Remove ground test plug and install test plug.

R (3) Connect test plug to valve tester. Verify that R pressure is not applied to test port.

R (4) Turn on electrical power (Ref. 24-41-00).

R (5) On Flight Engineer/Second Officers aft circuit breaker R panel CB1, zone 210, verify that circuit breaker ISLN R VALVE (G16) is closed.

R (6) On Flight Engineer/Second Officers ENGINE BLEED CONTROL R panel, zone 215, release ISLN VALVE switchlight. R Verify that valve is closed (position indicator points R to SHUT and switchlight flowbar is off and OFF is R illuminated).

R (7) Apply 7 psig to test port. Verify that valve remains R closed.

R (8) On ENGINE BLEED CONTROL panel, depress (latch in) ISLN R VALVE switchlight. Verify that valve opens (position R indicator points to OPEN and switchlight flowbar is R on).

R (9) Remove pressure from test port. Verify that valve R closes.

R (10) Reapply 7 psig to test port. Verify that valve opens.

R (11) On ENGINE BLEED CONTROL panel, release ISLN VLAVE R switchlight. Verify that valve closes.

R (12) Remove pressure from test port.

R (13) Remove test plug and reinstall ground test plug with
R new O-ring.

R (14) Tighten plug and secure with lock-wire.

R (15) Close access panel 1478B.

R (16) Remove tags installed at beginning of Paragraph 4B

R R AFT ISOLATION VALVE
INSPECTION AND CHECK

R 1. General

R Units with excessive or unreparable damage should be replaced R and sent to overhaul.

R 2. Referenced Procedure.

R 36-14-01 Aft Isolation Valve - Cleaning and Painting

R 3. Inspection/Check

R A. Inspection

R (1) Inspect electrical connector for broken pins or other R damage.

R (2) Inspect inlet and outlet flanges for nicks, dents, or R other damage.

R (3) Loosen filter nut and remove filter seal. Discard R seal.

R (4) Inspect filter for clogged or dirty pores.

R (5) If required, clean dirty or clogged filter (Ref. R 36-14-01, Cleaning and Painting).

R (6) Install new seal on filter.

R (7) Install filter and secure with nut.

AFT ISOLATION VALVE CLEANING AND PAINTING

1. Equipment and Materials

Soft-bristle brush

Petroleum Solvent, Spec AMS3160B, or equivalent

Lint-free cloth

2. Referenced Procedure

36-14-01 Aft Isolation Valve - Inspection and Check

3. Cleaning/Painting

A. Cleaning

WARNING: USE PETROLEUM SOLVENTS ONLY IN A WELL-VENTILATED AREA AND WITH PROPER PRECAUTIONS TO PREVENT FIRE. WEAR GOGGLES WHEN USING COMPRESSED AIR TO DRY PARTS.

CAUTION: USE COMPRESSED AIR CAREFULLY ON FINE-MESH FILTER SCREEN TO PREVENT DAMAGE.

(1) Clean dirty or clogged filter (Ref. 36-14-01, Inspection and Check) with solvent. Use a soft-bristle or immerse and agitate filter in solvent.

(2) Clean all exterior surfaces of valve with a lint-free cloth dampened in solvent.

(3) Dry unit with dry, filtered, compressed air.

CROSSBLEED DUCT ISOLATION VALVE - MAINTENANCE PRACTICES

1. General

R The left and right crossbleed duct isolation valves are
R butterfly type valves used to isolate portions of the pneumatic
R system and enable crossbleed control for routing air between
R pressure sources and using systems. The valves are located on
R each side of the fuselage centerline in the crossbleed manifold
R below the forward beam of the wing center section.

2. Maintenance Practices

A. Deactivation

(1) Open access panel 142DB.

(2) Remove manual position lock pin (3/8-inch hex) from isolation valve.

(3) Use 1/2-inch wrench on manual override hex and position indicator to open isolation valve.

(4) When valve position indicator is at fully OPEN position, install lock pin, long end first, and tighten.

(5) Use wrench on override hex to verify valve is locked in open position.

(6) Install access panel opened in Step 2A(1).

(7) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, zone 215, placard applicable CROSSBLEED switchlight ISOLATION VALVE INOPERATIVE.

(8) Make appropriate entry in aircraft log book.

R CROSSBLEED DUCT ISOLATION VALVES - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the left and right crossbleed duct isolation valves except for circuit breaker references. Removal and installation procedures for the left and right crossbleed valve air filter are the same except for circuit breaker references.

2. Equipment and Materials

A. Crossbleed Valves

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

R Protective covers

R B. Air Filters, Crossbleed Valve

R Filter - Parker Hannifin P/N 2691075

R Preformed Packing - Parker Hannifin P/N 2661058R015

Grease - Dow Corning No. 33 or equivalent

Tool - Preformed Packing Applicator - Parker Hannifin P/N H80-0-114-3 or equivalent

Lockwire - MS20995N20, 0.020-inch diameter, or equivalent

3. Referenced Procedure

R	6-40-00	Exterior Access Doors and Removable Panels
	20-00-06	Safetying Practices
	20-36-01	Single T-bolt V-band Coupling - Removal and Installation

4. Removal/Installation - Crossbleed Duct Isolation Valves

A. Removal

R (1) Placard Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

R (2) On the pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENGINE BLEED CONTROL - CROSS BLEED VALVES - L (G17) or R (G18).

R (3) Remove access panel 1420B (Ref. 6-40-00).

R WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

R (4) Disconnect electrical connector from valve.

R (5) Remove lock wire coupling covers (Ref. 20-00-06).

R (6) Remove covers from couplings on each side of isolation valve (Ref. Fig. 401).

R (7) Remove single T-bolt V-band coupling on each side of valve (Ref. 20-36-01).

R (8) Remove valve mounting bolts and remove valve.

R (9) Install protective covers on ducts.

B. Installation

R (1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

R (2) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

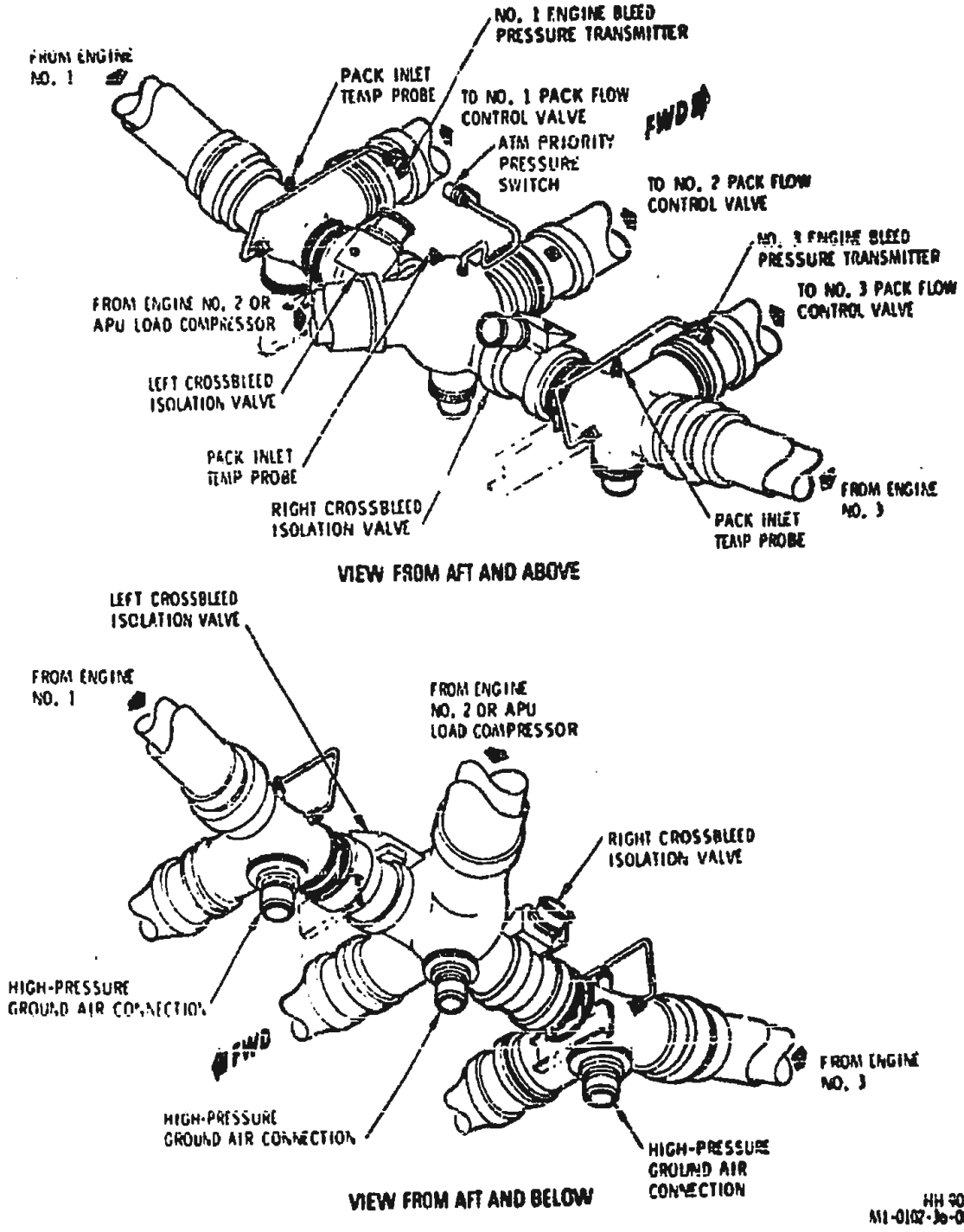
R (3) Remove protective covers from ducting. Check ducts for cleanliness and condition.

R (4) Position valve in place between ducts, with mounting bracket in proper position, and install mounting bolts.

R (5) Secure valve to ducts with single T-bolt V-band couplings (Ref. 20-36-01).

R (6) Install coupling covers.

R (7) Secure coupling covers with safety wire (Ref. 20-00-06).


NO. 1 ENGINE BLEED PRESSURE TRANSMITTER
FROM ENGINE NO. 1
PACK INLET TEMP PROBE
TO NO. 1 PACK FLOW CONTROL VALVE
FWD
ATM PRIORITY PRESSURE SWITCH
TO NO. 2 PACK FLOW CONTROL VALVE
NO. 3 ENGINE BLEED PRESSURE TRANSMITTER
TO NO. 3 PACK FLOW CONTROL VALVE
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
LEFT CROSSBLEED ISOLATION VALVE
PACK INLET TEMP PROBE
RIGHT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 3
PACK INLET TEMP PROBE
VIEW FROM AFT AND ABOVE
LEFT CROSSBLEED ISOLATION VALVE
FROM ENGINE NO. 1
FROM ENGINE NO. 2 OR APU LOAD COMPRESSOR
RIGHT CROSSBLEED ISOLATION VALVE
HIGH-PRESSURE GROUND AIR CONNECTION
FWD
FROM ENGINE NO. 3
HIGH-PRESSURE GROUND AIR CONNECTION
HIGH-PRESSURE GROUND AIR CONNECTION
VIEW FROM AFT AND BELOW
HH 3093
M1-0102-36-084

Crossbleed Manifold
Figure 401

R (8) Connect electrical connector to valve and lock-wire
R connector.

R (9) Install access panel removed in Step 4A(3).

R (10) Remove tag and close circuit breaker opened in Step
R 4A(2).

R (11) Remove placards installed in Step 4A(1).

R 5. Removal/Installation - Crossbleed Valve Air Filter

A. Removal

R (1) Placard Flight Engineer/Second Officers (FE/SO) bleed
R air and APU control panels and the three high-pressure
R ground air connections to prevent operation until
R completion of procedures.

R (2) On the pilots overhead circuit breaker panel CB1, zone
R 210, open and tag circuit breaker ENGINE BLEED CONTROL
R - CROSS BLEED VALVES - L (G17) or R (G18).

R (3) Remove access panel 142DB (Ref. 6-40-00).

R WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL
R REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH
R SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE
R USED WHEN REQUIRED.

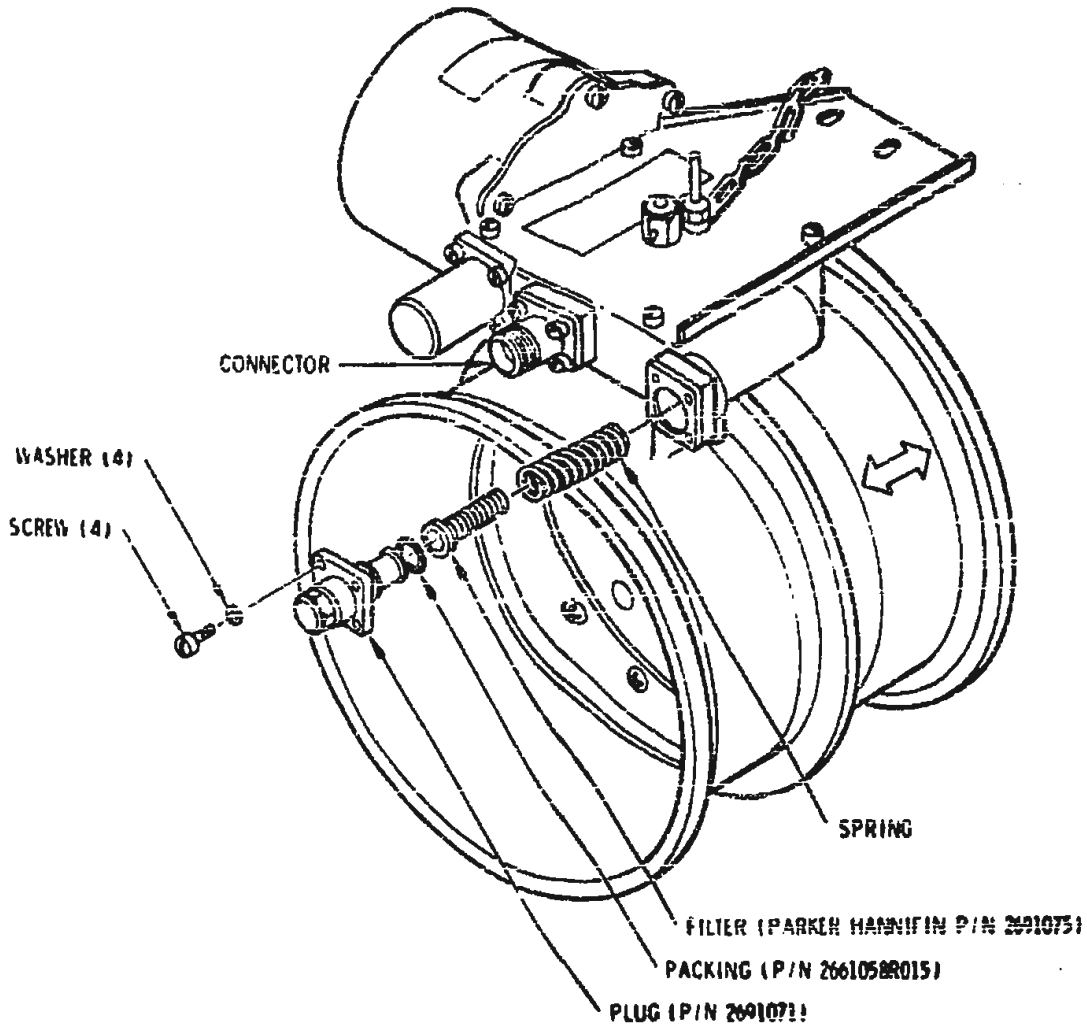
R (4) Remove lock wire between filter plug and connector

R (5) Remove screws (4) and washers (4) from plug-Parker
R Hannefin P/N 2691071 (Ref. Fig. 402). Remove spring
R and filter from housing. Separate packing from plug
R and discard packing.

B. Installation

R (1) Verify that tags previously installed on FE/SO bleed
R air and APU control panels and the three high-pressure
R ground air connections are in place.

R (2) Assemble packing (Parker Hannifin P/N 2661058R015) on
R plug (Parker Hannifin P/N 2691071) using preformed
R packing applicator. (3) Install spring, filter and
R plug (Parker Hannifin P/N 2691071) with packing into
R filter housing (Ref. Fig. 402).



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R Crossbleed Valve Air Filter - Removal and Installation
R Figure 402

R (4) Apply Dow Corning No. 33 grease to screws and washers
R and assemble through plug (Parker Hannifin P/N 2691071)
R into housing.

R (5) Lock wire plug with screws on connector.

R (6) Install access panel removed in Step 5A(3).

R (7) Remove tag and close circuit breaker opened in Step
R 5A(2).

R (8) Remove placards installed in Step 5A(1).

R CROSSBLEED DUCT ISOLATION VALVE - ADJUSTMENT AND TEST

R 1. General

R The crossbleed isolation valve is a butterfly type valve used to
R isolate the left and right wing pneumatic ducts from the rest of
R the pneumatic system.

R The following procedure provides for a leak limit in which a
R valve is considered to provide adequate isolation when in the
R closed position.

R 2. Referenced Procedures

R 36-00-00 Pneumatic System - Maintenance Practices

R 49-00-00 Airborne Auxiliary Power - Description and
R Operation

R 3. Adjustment/Test

R A. Rate Leak Check Test

R (1) Pressurize the pneumatic manifold to a 20 psi minimum
R with the APU operating in normal mode or with an
R external air cart hooked up to the center high pressure
R ground air connection.

R (2) Select CLOSE the left and right crossbleed valves.

R (3) Select OPEN the No. 1 and No. 3 pack flow control
R valves. Select CLOSE the No. 2 pack flow control
R valve.

R (4) Select CLOSE the No. 1 and No. 3 engine isolation
R valves.

R (5) Record the indicated air pressure in the No. 1 and No.
R 3 engine air supply ducts.

R (6) Record 90 percent of the indicated air pressure in the
R No. 2 engine supply duct.

R (7) Select CLOSE the No. 1 and No. 3 pack flow control
R valves and monitor the increase in air pressure in the
R No. 1 and No. 3 engine supply ducts. Record the time
R it took the No. 1 or No. 3 engine supply duct air

R pressure to increase to the air pressure recorded in
R step (6).

R (8) If the time recorded in step (7) is less than 8
R seconds, the valve must be replaced prior to further
R flight.

R (9) If the time recorded in step (7) is 8 seconds or
R greater, crossbleed valve leakage is acceptable.

WING DUCT TOLERANCE COMPENSATOR - REMOVAL AND INSTALLATION

1. General

The removal and installation procedure for the left and right wing duct tolerance compensators is identical. The duct tolerance compensators are located below the wing center section, zone 142.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

3. Referenced Procedure

	20-00-06	Safetying Practices
	20-36-01	Single T-bolt V-band Coupling - Removal and Installation
R	36-00-00	Pneumatic System - Inspection and Check

4. Removal/Installation

A. Removal

WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Remove access panel 1420B (Ref. Fig. 401).

(2) Remove safety wire securing insulation covers (Ref. 20-00-06).

(3) Open overlapping insulation covers and remove from duct tolerance compensator.

(4) Remove single T-bolt V-band coupling on each side of tolerance compensator (Ref. 20-36-01).

(5) Remove tolerance compensator.

(6) Install protective covers on duct flanges.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Remove protective covers from duct flanges.

(2) Attach one end of duct tolerance compensator with single T-bolt V-band coupling (Ref. 20-36-01).

(3) If tolerance compensator length adjustment is required, use a standard strap wrench on outer housing and rotate to obtain 4.38-inch length. Reinstall lock-wire at two points 130 degrees apart.

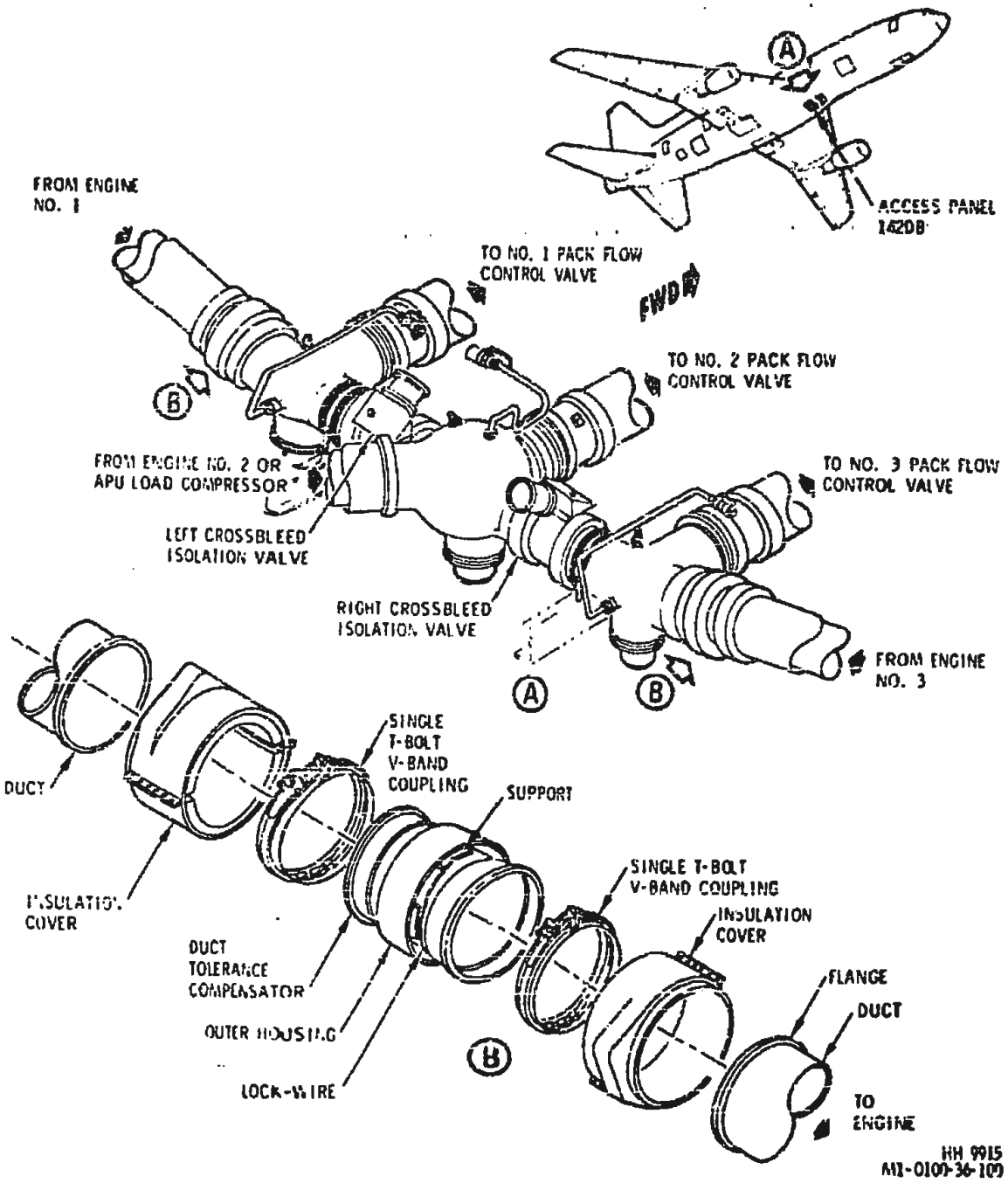
(4) Attach other end of tolerance compensator with single T-bolt V-band coupling (Ref. 20-36-01).

(5) Install insulation covers on tolerance compensator and safety-wire (Ref. 20-00-06).

R (6) Remove tags installed at beginning of Paragraph 4.

R (7) Inspect tolerance compensator for leaks (Ref.
R 36-00-00).

R (8) Install access panel.



Wing Duct Tolerance Compensator - Removal and Installation
Figure 401

AFT FUSELAGE DUCT COMPENSATOR - REMOVAL AND INSTALLATION

1. General

The aft fuselage duct compensator is located in center cargo compartment behind liner panel, zone 153.

2. Equipment and Materials

Protective Caps

3. Referenced Procedures

	20-36-01	Single T-bolt V-band Coupling - Removal and Installation
	25-51-09	Center Cargo Compartment Liner Panel - Removal and Installation
R	36-00-00	Pneumatic System - Maintenance Practices

4. Removal/Installation

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM AIR TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

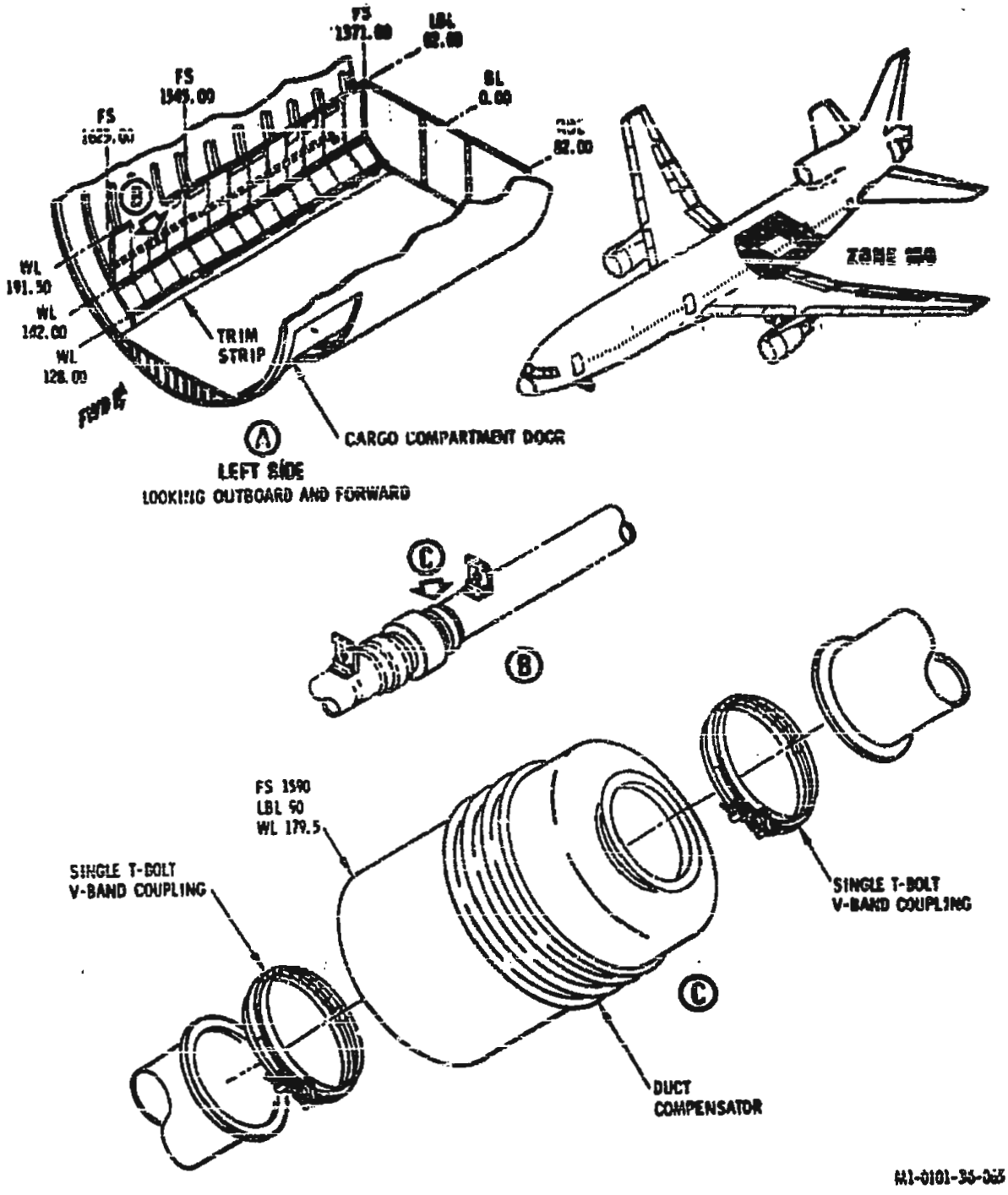
(1) Remove center cargo compartment liner panel 153 HL (Ref. 25-51-09).

(2) Remove insulation covers (boots) from ends of compensator.

(3) Remove single T-bolt V-band couplings (Ref. 20-36-01) securing compensator to ducts.

(4) Remove compensator (Ref. Fig. 401).

(5) Install protective caps on ducts.



Aft Fuselage Duct Compensator - Removal and Installation
Figure 401

RR

EFFECTIVITY: ALL

001B

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Remove protective caps from ducts.

(2) Put compensator in position and secure compensator to ducts with single T-bolt V-band couplings (Ref. 20-36-01).

NOTE: Ensure that insulation covers (boots) fully cover the V-band couplings.

R (3) Remove placards installed at beginning of Paragraph 4A.

R (4) Operate pneumatic system using APU as power source
R (Ref. 36-00-00), and inspect duct compensator for
R leaks.

R (5) Install liner panel removed in Step 4A(1).

MID FUSELAGE DUCT COMPENSATOR - REMOVAL AND INSTALLATION

1. General

The mid fuselage duct compensator is located in below wing center section box, zone 140.

2. Equipment and Materials

Protective caps

3. Referenced Procedure

	20-36-01	Single T-bolt V-band Coupling - Removal and Installation
	6-40-00	Exterior access doors and panels, zone 100
R	36-00-00	Pneumatic System - Maintenance Practices

4. Removal/Installation

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Open access panel 142GB and enter area below wing center section box (Ref. 6-40-00).

(2) Locate mid fuselage duct compensator (Ref. Fig. 401).

(3) Remove insulation covers (boots) from ends of compensator.

(4) Remove single T-bolt V-band couplings (Ref. 20-36-01) securing compensator to ducts.

(5) Remove compensator.

(6) Install protective caps on ducts.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Remove protective caps from ducts and inspect ducts for cleanliness and condition.

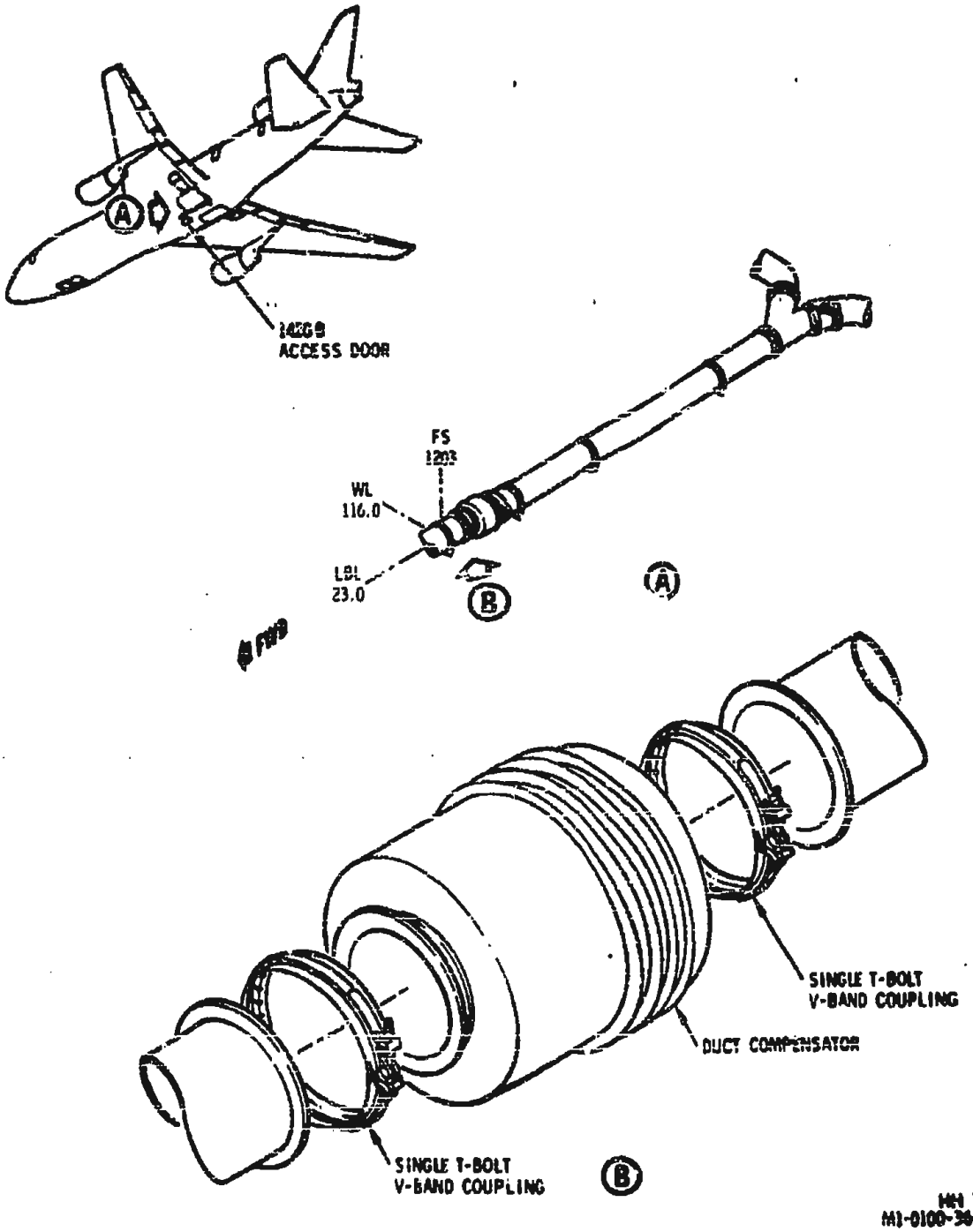
(2) Put compensator in place and secure compensator to ducts with single T-bolt V-band couplings (Ref. 20-36-01).

NOTE: Ensure that insulation covers (boots) fully cover the V-band couplings.

R R (3) Remove placards installed at beginning of Paragraph 4.A.

R R R (4) Operate pneumatic system using APU as power source (Ref. 36-00-00), and inspect duct compensator for leaks.

R (5) Install access panel removed in Step 4.A.(1).



Mid Fuselage Duct Compensator - Removal and Installation
Figure 401

WING DUCT COMPENSATOR - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures for the left and right wing duct compensators are the same except for access panel references.

2. Referenced Procedures

20-00-06	Safetying Practices
20-36-01	Single T-Bolt V-Band Coupling - Removal/Installation

3. Removal/Installation

R A. Removal

R WARNING: PLACARD FLIGHT ENGINEERS/SECOND OFFICERS (FE/SO) BLEED
R AIR AND APU CONTROL PANELS AND THE THREE HIGH PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Remove access panel 511GB for left wing compensator or 611GB for right wing compensator.

(2) Remove safety wire securing coupling cover (Ref. 20-00-06).

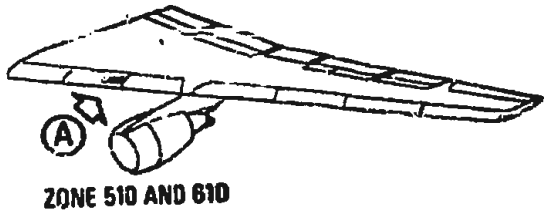
(3) Remove cover from coupling.

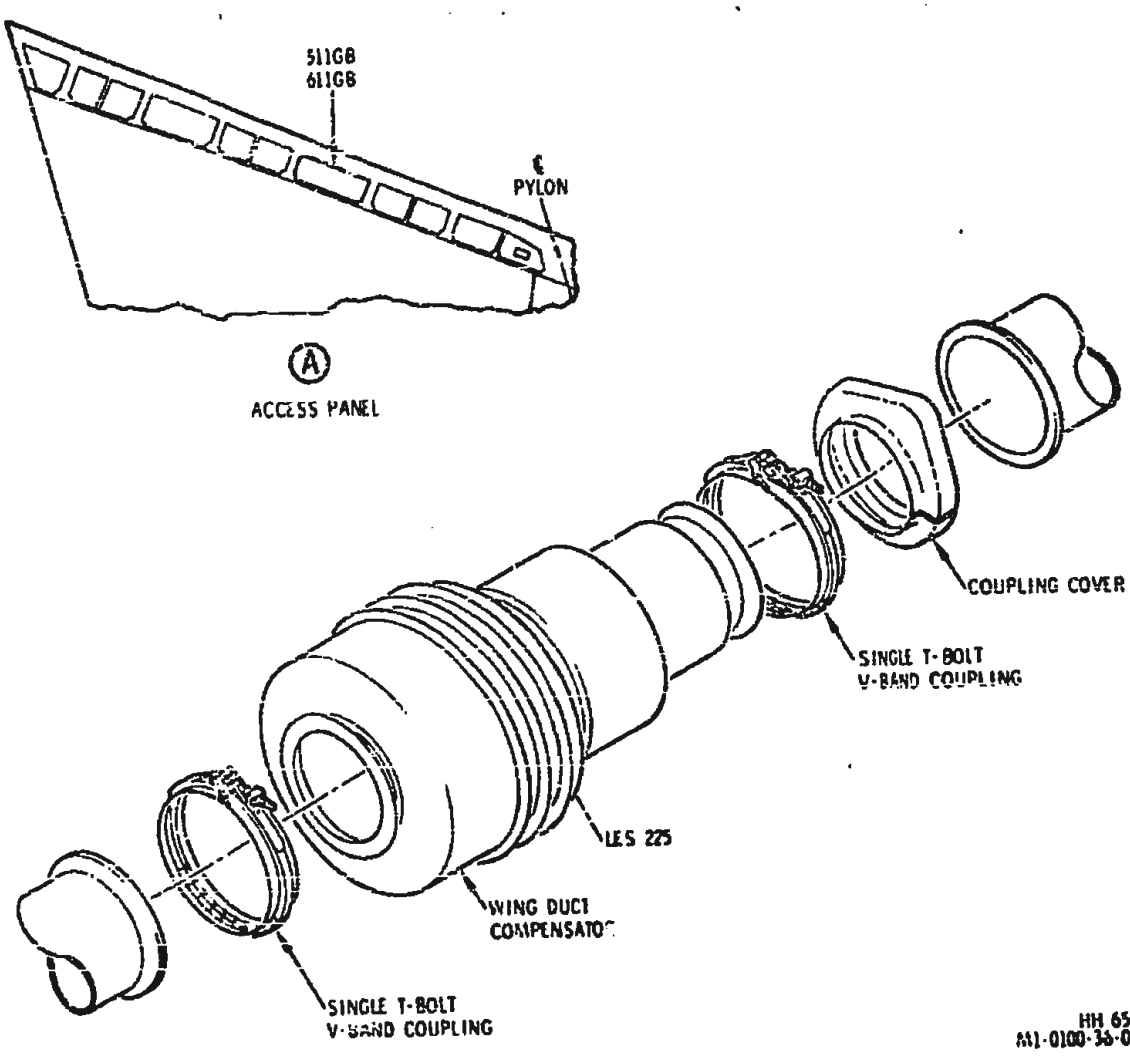
(4) Remove single T-bolt V-band couplings (Ref. 20-36-01) securing compensator in duct.

(5) Remove compensator.

(6) Install protective covers over ducts.

B. Installation





Wing Duct Compensator - Removal and Installation
Figure 401

R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO
R BLEED AIR AND APU CONTROL PANELS AND THE THREE
R HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Remove protective covers from ducts and inspect ducts for cleanliness and condition.

(2) Put compensator in position between duct ends and secure compensator with single T-bolt V-band couplings (Ref. 20-36-01).

(3) Secure coupling cover with safety wire (Ref. 20-00-06).

(4) Install access panel.

(5) Remove placards installed in Step 3.

DISTRIBUTION MANIFOLD DUCT PRESSURE SEAL REMOVAL AND INSTALLATION

1. General

Removal and Installation procedures are the same for the left, right and center duct pressure seals.

NOTE: On aircraft 001-033 with SB21-214, the air differential pressure switch is deactivated.

2. Referenced Procedure

20-00-06	Safetying Practices
20-36-01	Single T-bolt V-band Coupling - Removal and Installation
36-14-24	Air Differential Pressure Switch - Removal and Installation

3. Removal/Installation

A. Removal

(1) Tag Flight Engineer/Second Officer (FE/SO) ENGINE BLEED CONTROL and APU CONTROL panels and the three high-pressure ground air connections to prevent operation of pneumatic system until completion of procedures.

(2) On FE/SO ENGINE BLEED CONTROL panel verify ENG ISLN VALVE 1, 2, 3, CROSS BLEED left, right and aft fuselage ISLN VALVE switchlights are released, OFF lights are on and flowbars are off. On APU CONTROL panel verify BLEED AIR S/O switchlight is released and OPEN is off.

(3) Enter mid electrical service center, zone 137, and remove floor panel.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Remove safety wire securing coupling cover (Ref. 20-00-06).

(5) Remove single T-bolt V-band coupling (Ref. 20-36-01) securing distribution manifold left, right or center to No. 1, No. 3 and No. 2 flow control valves respectively.

(6) On aircraft 001-033, remove air differential pressure switch, (Ref. 36-14-24) bolt, and packing from T-duct.

R NOTE: The air differential pressure switch may have
R been previously deactivated or removed.

(7) Remove band clamp securing pressure seal.

(8) Remove access panel 142DB to forward end of hydraulic service center for access to distribution manifold.

(9) Loosen transducer union and remove tube from aft of T-duct.

(10) Remove support clamp inboard of T-duct.

(11) Remove single T-bolt V-band coupling (Ref. 20-36-01) outboard of T-duct.

(12) Remove band clamp securing pressure seal.

(13) Slide T-duct aft.

(14) Remove pressure seal.

(15) Install protective cover over fittings and tube.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

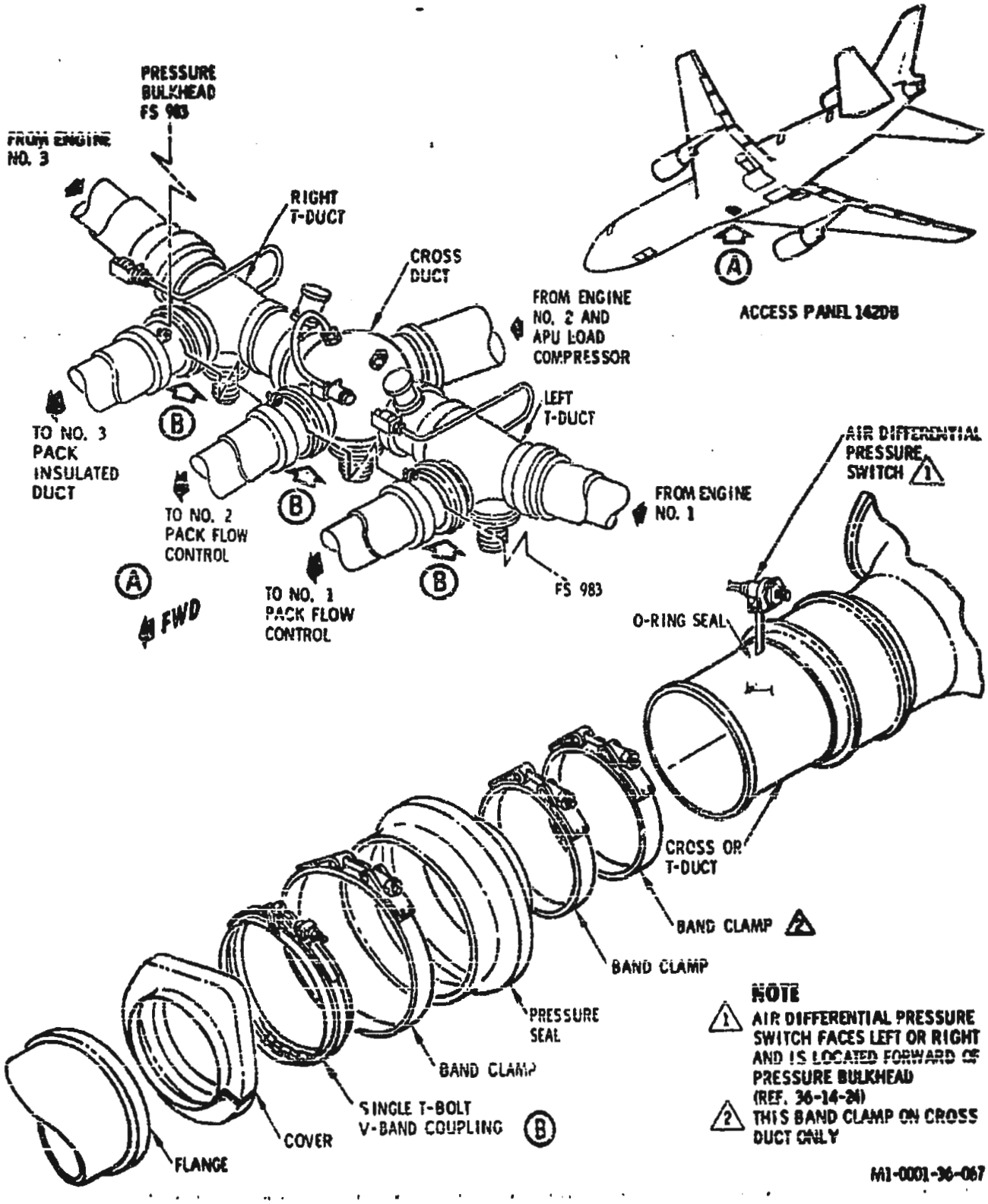
(3) Enter hydraulic service center.

(4) Install pressure seal into pressure bulkhead.

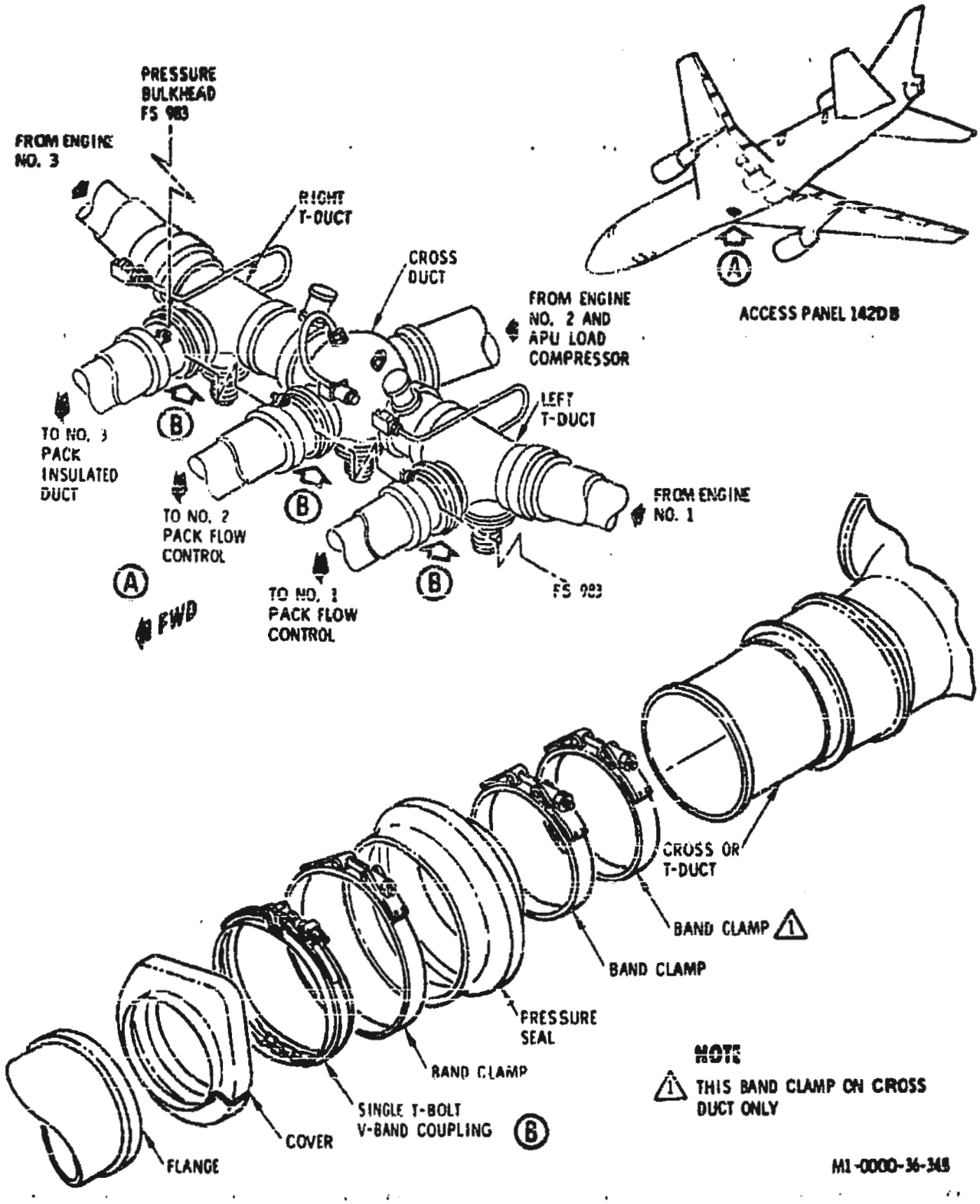
(5) Remove protective covers from fitting.

(6) Insert T-duct forward through pressure seal.

(7) Secure pressure seal with band clamp, aft of bulkhead.



Distribution Manifold Duct Pressure Seal - Removal and Installation
Figure 401



Distribution Manifold Duct Pressure Seal - Removal and Installation
Figure 401

(8) Install single T-bolt V-band coupling (Ref. 20-36-01) outboard of T-duct.

(9) Install support clamp inboard of T-duct.

(10) Secure transducer tube to aft of T-duct with union.

(11) Secure pressure seal with band clamp forward of bulkhead.

R (12) On aircraft 001-033, with air differential pressure
R switch,
R install air differential pressure switch (Ref.
R 36-14-24) and packing with bolt on T-duct.

(13) Secure T-duct to No. 1 flow control valve (or No. 3 pack insulated duct) with single T-bolt V-band coupling (Ref. 20-36-01).

(14) Install and secure coupling cover with safety wire (Ref. 20-00-06).

(15) Install access panel 142DB.

(16) Remove tags and close circuit breakers opened in Step 3A(2).

(17) Remove tags installed in Step 4A(1).

AFT FUSELAGE DUCT PRESSURE SEAL - REMOVAL AND INSTALLATION

1. General

Removal and Installation procedures are the same for the pressure seals in the aft end of the aft cargo compartment and in the forward end of center cargo compartment.

2. Referenced Procedures

20-00-06	Safetying Practices
6-40-00	Exterior access doors and panels, zone 190
20-36-01	Single T-bolt V-band Couplings - Removal and Installation

3. Removal/Installation

A. Removal - Pressure Seal at FS 1393

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel verify ENG ISLN VALVE NO. 2 and aft fuselage ISLN VALVE switchlights are released, OFF lights are on, and flowbars are off. On APU CONTROL panel verify BLEED AIR S/O switchlight is released and OPEN is off.

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, open and tag circuit breaker DUCT AREA OVHT DET DC (W13) and DUCT AREA OVHT DET AC (W14).

(3) Remove access panel 195B (Ref. 6-40-00) located aft of Hydraulic Service Center on lower left contour of fuselage.

(4) Enter work area and locate seal on bleed air duct at pressure shell FS1393, WL 140, LBL 100 (Ref. Fig. 401 Sheet 1)

(5) Remove safety wire securing coupling cover (Ref. 20-00-06).

(6) Remove duct coupling cover and coupling to facilitat
R replacement of seal (Ref. Fig. 401 Sheet 1 and
R 20-36-01).

(7) Remove couplings securing pressure seal to duct and fuselage.

(8) Remove pressure seal.

(9) Install protective cover over both ends of duct.

B. Installation - Pressure Seal at FS 1393

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breakers opened in Step 3A(2) are open and tagged.

(2) Mark a line 1.38 inches from end of fuselage pressure shell flange (Ref. Fig. 401 Sheet 1).

(3) Install loosely coupling clamp on large end of seal.

(4) Install large end of seal on fuselage pressure shell flange so that edge of seal is at marked line (Ref. Fig. 401 Sheet 1), and tighten clamp.

(5) Install lower end of seal on bleed air (inner) duct so that edge of seal is a maximum of 0.20 inches from end of duct.

(6) Secure lower end of seal to bleed air duct with clamp.

R CAUTION: PRIOR TO TIGHTENING COUPLING, VERIFY DUCT IS
R ALIGNED SUCH THAT A MINIMUM CLEARANCE OF 1-INCH
R BETWEEN DUCT (0.50-INCH BETWEEN DUCT INSULATION),
R DUCT CLAMPS, TEE BOLTS AND NUTS, WIRE HARNESSES,
R HYDRAULIC LINES AND UNITS, SURROUNDING STRUCTURE
R AND ETC. IS MAINTAINED.

R (7) Assemble bleed air duct dismantled in Step 3A(6) (Ref.
R 20-36-01).

R NOTE: Use vertical and lateral adjustments of the
R supports and/or duct rotation to maintain
R required minimum clearance.

(8) Secure coupling cover with safety wire (Ref. 20-00-06).

(9) Install access panel removed in Step 3A(3).

(10) Remove WARNING tags installed in Paragraph 3A.

C. Removal - Pressure Seat at FS 1839 (Aft Bulkhead)

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel verify ENG ISLN VALVE NO. 2 and aft fuselage ISLN VALVE switchlights are released and OFF illuminating. On APU CONTROL panel verify BLEED AIR S/O switchlight is released and OPEN is off.

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, open and tag circuit breaker DUCT AREA OVERHEAT DET/DC (W13) and DUCT AREA OVERHEAT DET/AC (W14).

(3) Open afterbody access panel 316BB (Ref. 6-40-00) and locate pressure seal (Ref. Fig. 401 Sheet 2).

(4) Remove safety wire securing coupling cover (Ref. 20-00-06).

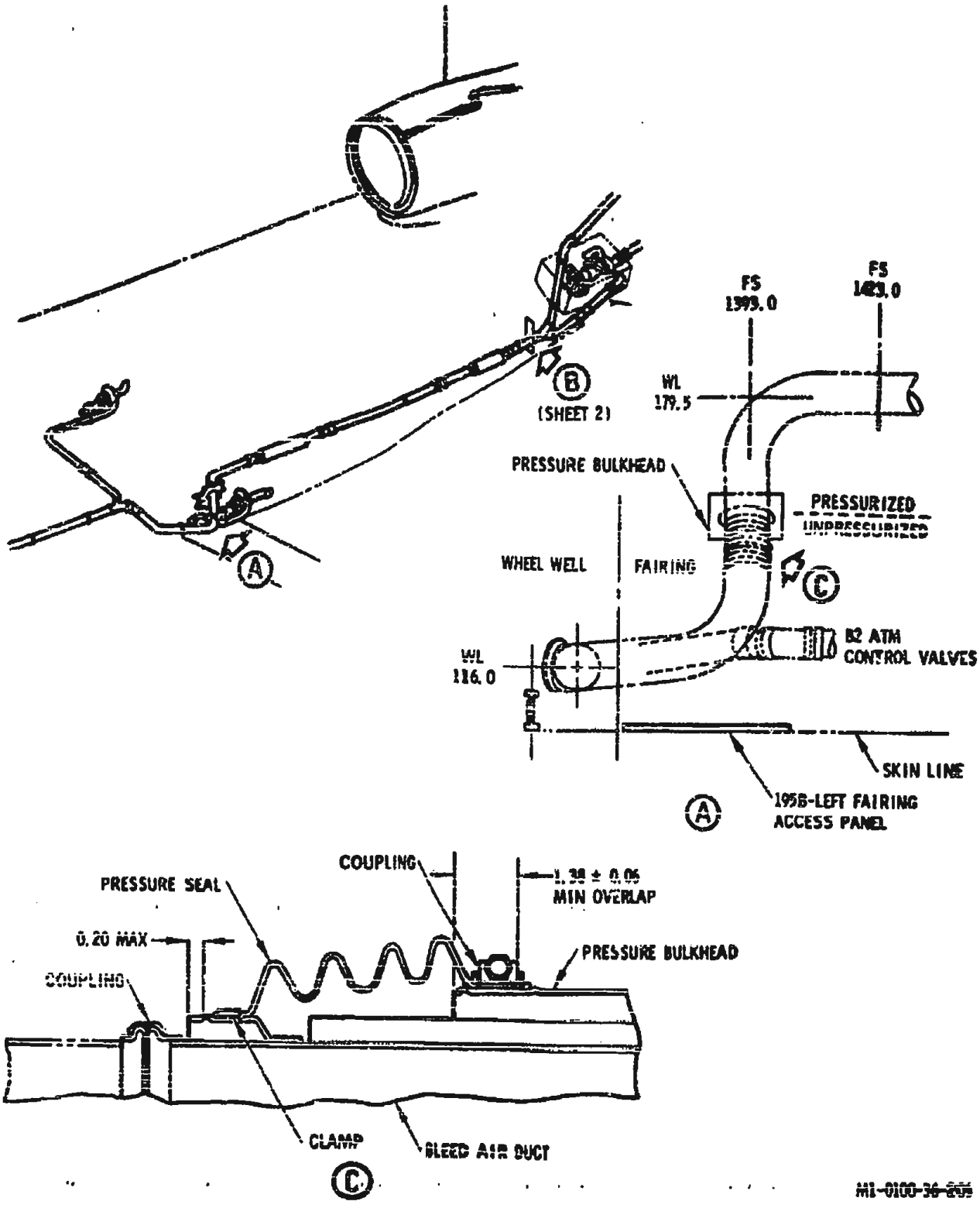
R (5) To facilitate pressure seal removal, remove coupling cover and loosen coupling (Ref. 20-36-01) and disassemble coupled ducting aft of the pressure seal (Ref. Fig. 401 Sheet 2).

(6) Loosen coupling from both ends of the pressure seal and remove seal.

(7) Install protective cover over both ends of duct.

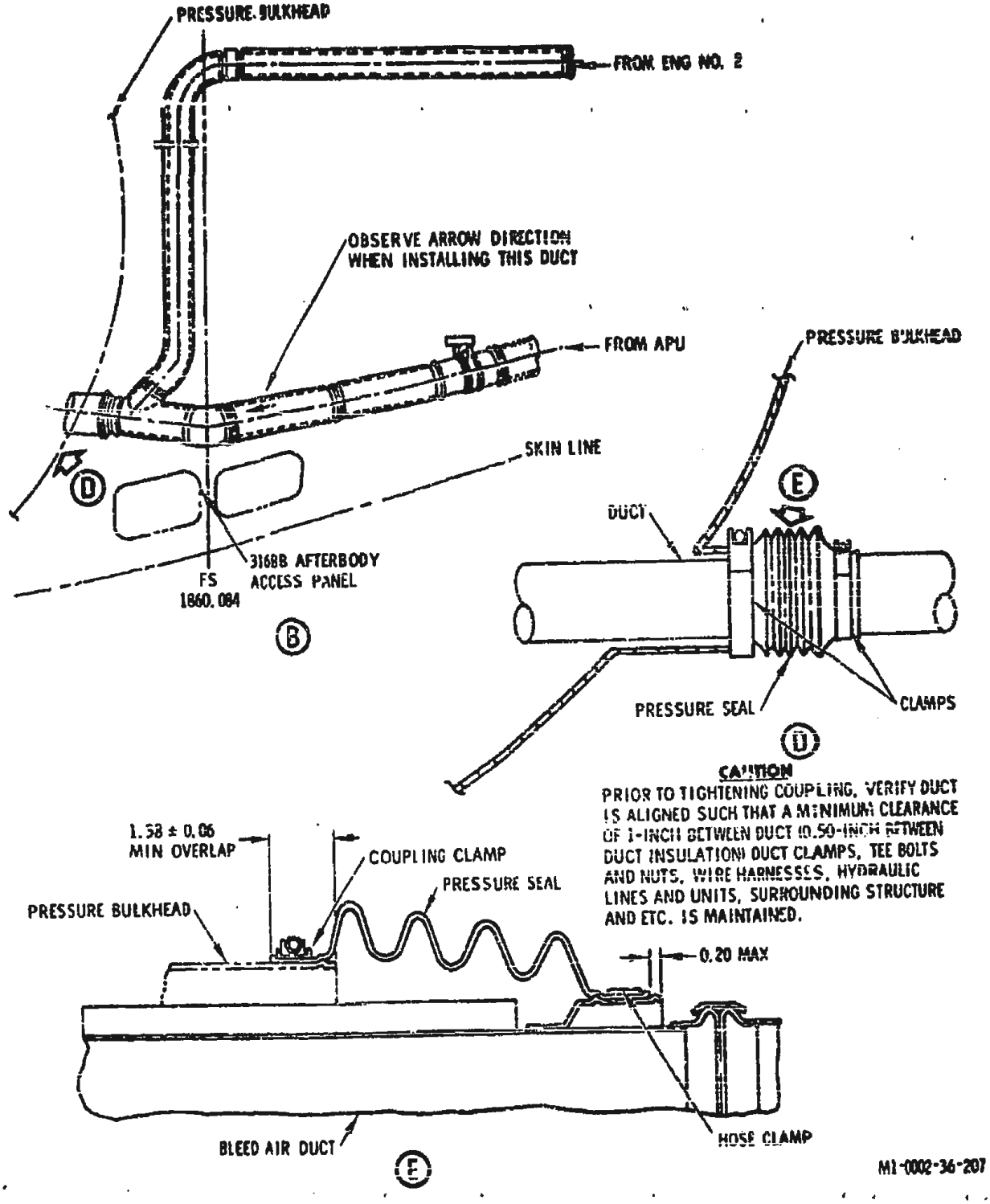
D. Installation - Pressure Seal at FS 1839 (Aft Bulkhead)

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.



M1-0100-36-205

Bleed Air Duct Pressure Seal - Removal/Installation
Figure 401 (Sheet 1)



R Bleed Air Duct Pressure Seal - Removal/Installation
R Figure 401 (Sheet 2)

R (1) Verify that circuit breakers opened in Step 3B(2) are open and tagged.

(2) Mark a line 1.38 inches from end of fuselage pressure bulkhead flange (Ref. Fig. 401 Sheet 2).

(3) Install loosely coupling clamp on large end of seal.

(4) Install large end of seal on fuselage pressure bulkhead flange so that edge of seal is at marked line (Ref. Fig. 401 Sheet 2), and tighten clamp.

(5) Install aft end of seal on bleed air duct so that edge of seal is a maximum of 0.20 inches from end of duct (Ref. Fig. 401 Sheet 2).

(6) Secure aft end of seal to bleed air duct with clamp.

R CAUTION: PRIOR TO TIGHTENING COUPLING, VERIFY DUCT IS
R ALIGNED SUCH THAT A MINIMUM CLEARANCE OF 1-INCH
R BETWEEN DUCT (0.50-INCH BETWEEN DUCT INSULATION),
R DUCT CLAMPS, TEE BOLTS AND NUTS, WIRE HARNESSES,
R HYDRAULIC LINES AND UNITS, SURROUNDING STRUCTURE
R AND ETC. IS MAINTAINED.

R (7) Assemble bleed air duct dismantled in Step 3C(5) (Ref.
R 20-36-01).

R NOTE: Use vertical and lateral adjustments of the
R supports and/or duct rotation to maintain
R required minimum clearance.

(8) Install coupling cover and secure with safety wire (Ref. 20-00-06).

(9) Close afterbody access panel opened in Step 3C(3).

(10) Remove WARNING tags installed in Paragraph 3C.

SYSTEM C-ATM FEED DUCT SEAL - REMOVAL AND INSTALLATION

1. General

This seal prevents air from flowing into the wing fuselage fairing area and causing drag. It is located on the 5-inch duct leading to the System C-ATM at the aft bulkhead of the right main landing gear (MLG) wheel well, FS 1363, zone 151.

2. Referenced Procedures

6-40-00	Exterior Access Doors and Panels
20-00-06	Safetying Practices
20-36-01	Single T-Bolt V-band Couplings - Removal and Installation

3. Removal/Installation

A. Removal

WARNING: PLACARD FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers (FE/SO) ENGINE BLEED CONTROL panel, verify ENG ISLN VALVE NO. 1, NO. 2, and NO. 3 and aft fuselage ISLN VALVE switchlights are released, OFF lights are on, and flowbars are off. On APU CONTROL panel, verify BLEED AIR S/O switchlight is released and OPEN light is off.

(2) On FE/SO aft circuit breaker panel CB3, open and tag circuit breakers DUCT AREA OVHT DET DC (W13) and DUCT AREA OVHT DET AC (W14). On FE/SO overhead circuit breaker panel CB2, open and tag circuit breaker ATM CONT IND SYS C (L19).

(3) In right MLG wheelwell, remove bolt and nut securing duct clamp to strut assembly (Ref. Fig. 401).

(4) Remove access panel 196B (Ref. 6-40-00) located aft of the right MLG wheelwell.

(5) Locate coupling just aft of seal at FS 1363, RBL90, (Ref. Fig. 401). Remove safety wire securing dust covers and remove dust covers from V-band couplings (Ref. 20-00-06).

(6) Remove V-band coupling (Ref. 20-36-01) and flexible coupling.

(7) Remove clamp securing seal to support.

(8) Remove 8 bolts, washers and nuts securing seal flange and retainers to bulkhead and remove retainers.

(9) Remove seal by sliding it aft over support and duct.

(10) Remove both halves of support by sliding aft over duct.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breakers opened in Step 3A(2) are open and tagged.

(2) Install both halves of support by sliding through bulkhead and over duct.

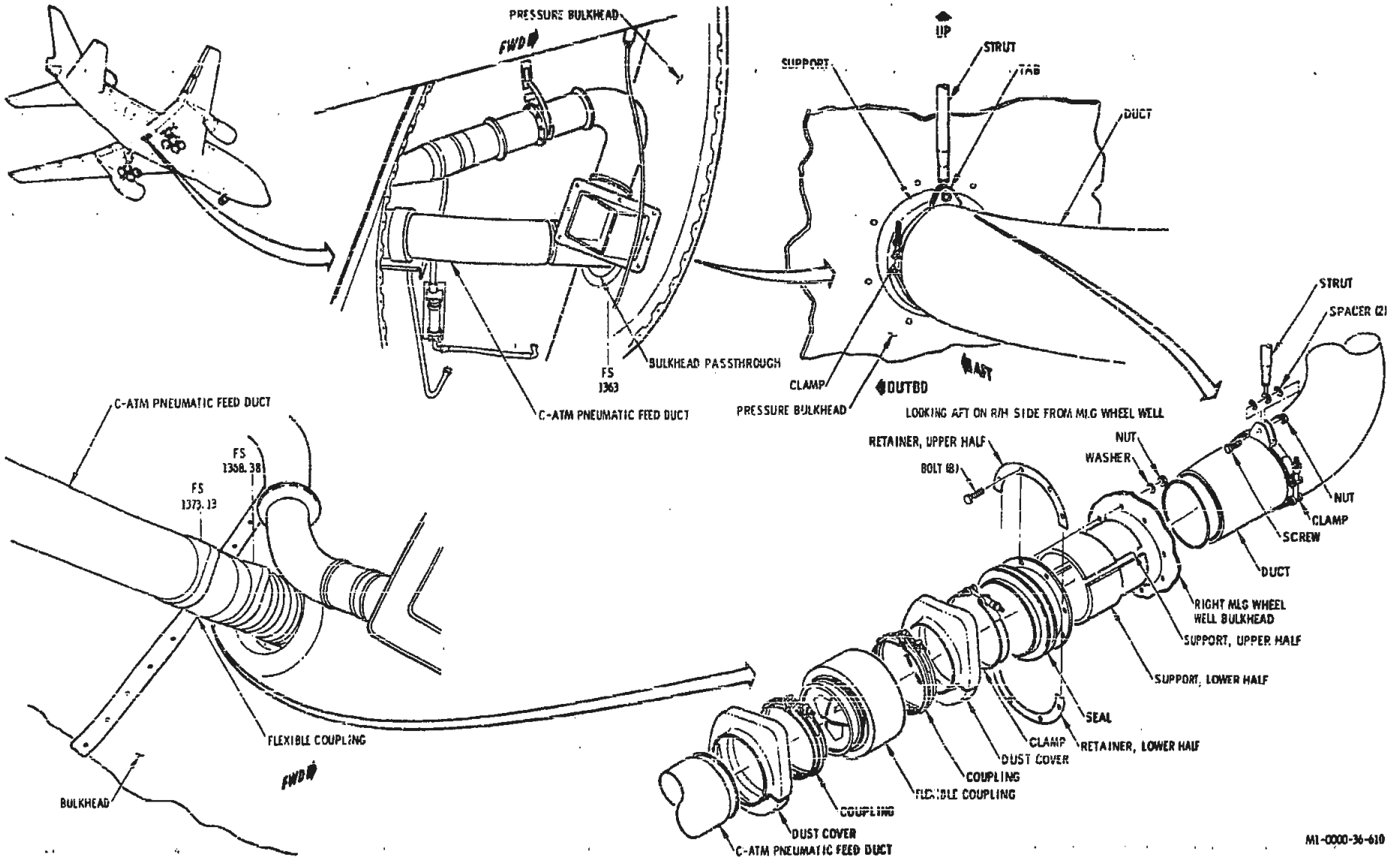
(3) Reconnect support strut assembly.

(4) Slide seal over supports with flange snug against bulkhead so that holes for bolts align with those in bulkhead.

(5) Install retainer on seal flange with holes aligned and install bolts with washers and nuts. Bolts should enter from aft side.

(6) Install V-band couplings (Ref. 20-36-01).

(7) Install dust covers over couplings and safety wire (Ref. 20-00-06).



System C-ATM Feed Duct Seal
Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITH SB36-043 AND 032-999

001B

DRAIN CONDENSATE VALVE - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures for the drain condensate valves in the hydraulic service center compartment, zone 147, and the left main landing gear wheel well compartment, zone 149, are the same, except for access references.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

Protective plugs

3. Removal/Installation

R A. Removal

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR
R AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Open access panel 147BB for drain condensate valve in hydraulic service center. Open left inboard main landing gear door 732A for drain condensate valve in left main landing gear wheel well (Ref. Fig. 401).

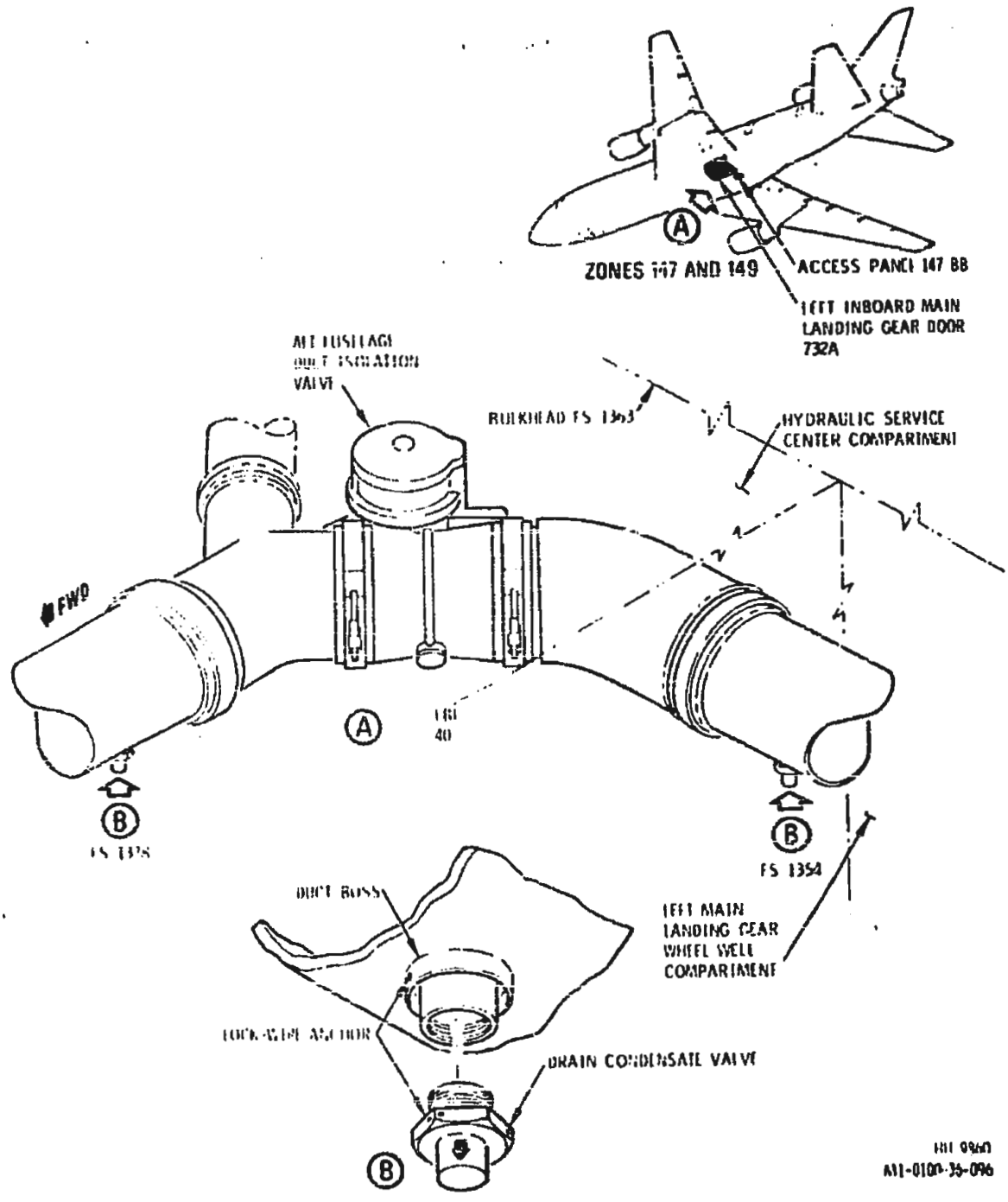
(2) Unscrew drain condensate valve from boss on bottom of duct.

(3) When valve clears duct, remove valve.

(4) Install protective plug in duct boss.

B. Installation

R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO
R BLEED AIR AND APU CONTROL PANELS AND THE
R THREE-PRESSURE GROUND AIR CONNECTIONS ARE IN
R PLACE.



R R Drain Condensate Valve - Removal and Installation
Figure 401

R R 050B EFFECTIVITY: ALL

(1) Remove protective plug from duct boss.

(2) Install drain condensate valve in duct boss.

(3) Tighten and lock-wire valve.

(4) Close access panel or close left inboard main landing gear door.

(5) Remove tags installed at beginning of Paragraph 3.

AIR DIFFERENTIAL PRESSURE SWITCH - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the No. 1, No. 2, and No. 3 air differential pressure switches except for access panel references. The air differential pressure switches are located in the mid electrical service center, zone 137, (Ref. Fig. 401).

R NOTE: On aircraft incorporating SB21-214, the air
R differential pressure switch is deactivated.

2. Equipment and Materials

O-ring (Ref. Fig. 401)

3. Removal/Installation

A. Removal

WARNING: FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS MUST BE TAGGED TO PREVENT OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) Tag Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections.

(2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ENVIR CONTROL SYSTEM - PACK - HI FLOW - CONT (H6).

(3) Open mid electrical service center access doors 192K and 137AZ.

(4) Lift hinged access panel 137AB, 137BB, or 137CB to gain access to the No. 1, No. 2, or No. 3 air differential pressure switch (pack excess flow sensor), respectively.

(5) Disconnect wire leads.

NOTE: When the -3 switch is installed, the aircraft wiring connected to the red stripe and green stripe wires of the -2 switch are capped and tied back.

(6) Remove screws securing air differential pressure switch to cross or T-duct.

(7) Remove air differential pressure switch and O-ring.

(8) Install protective cover over duct port.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Remove protective cover from duct port.

(3) Position O-ring over duct port.

(4) Insert air differential pressure switch probe into duct port and secure with screws.

(5) Reconnect wire leads. Switches have either three (3) or five (5) wire leads. The RED and GRN leads are not required and have been deleted from later model switches.

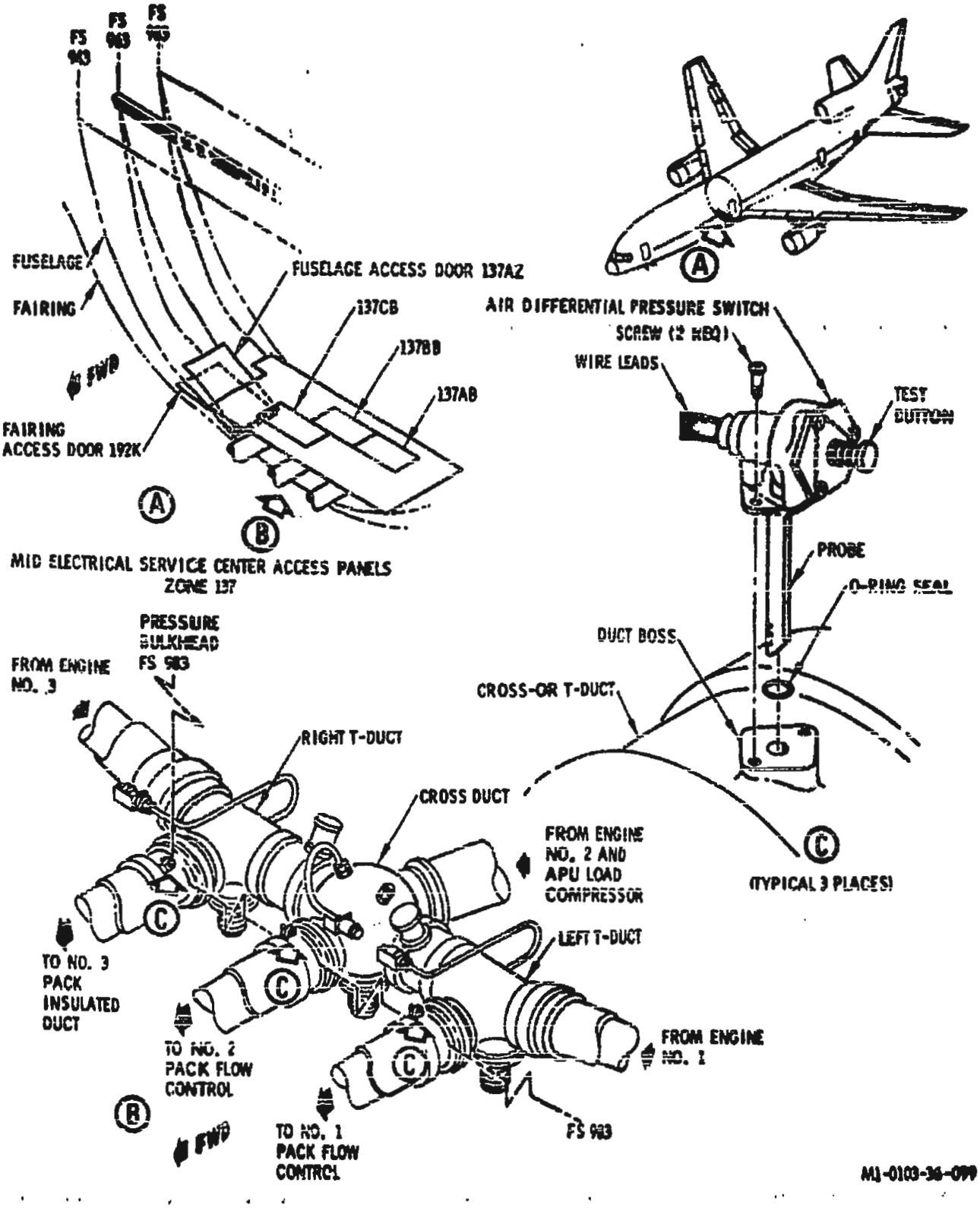
NOTE: When the -3 switch is installed, the aircraft wiring connected to the red stripe and green stripe wires of the -2 switch are capped and tied back.

(6) Close access panel.

(7) Close access doors 137AZ and 192K.

(8) Remove tag installed in Step 3A(1).

(9) Remove tag and close circuit breaker opened in Step 3A(2).



Air Differential Pressure Switch - Removal and Installation
Figure 401

AIR DIFFERENTIAL PRESSURE SWITCH - ADJUSTMENT AND TEST

1. General

The No. 1, No. 2, and No. 3 air differential pressure switches (ADPS-1, ADPS-2 and ADPS-3) are installed in pack No. 1, No. 2, and No. 3 supply ducts respectively upstream from the pack flow control valves. Each may be tested on the aircraft using a ground air source. The switches are not adjustable on the aircraft. They are located under the floor of the mid electrical service center, zone 137 (Ref. Fig. 501).

R
R NOTE: The air differential pressure switch is deactivated on aircraft incorporating SB21-214.

2. Referenced Procedures

6-50-00	Interior Access Doors and Removable Panels
21-00-00	Air Conditioning System - Maintenance Practices
23-43-00	Service Interphone System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
33-17-00	Annunciator System - Adjustment and Test
36-13-00	High Pressure Ground Air System - Description and Operation
78-30-00	Thrust Reverser - Servicing

3. Adjustment/Test

A. Preparation

NOTE: Two technicians are required to perform this test. One technician depresses the test button on the applicable air differential pressure switch while the other observes the flight station instruments.

WARNING: ENGINE NO. 1, NO. 2, AND NO. 3 THRUST REVERSERS MUST BE LOCKED IN THE FORWARD THRUST POSITION (REF. 78-30-00).

(1) Lock engine No. 1, No. 2, and No. 3 thrust reversers in the forward thrust position (Ref. 78-30-00).

NOTE: Do not manually lock engines No. 1 and No. 3 isolation valves in closed position. Do not open and tag THRUST REVERSE-ENG-1 and ENG-3 circuit breakers.

(2) Turn on electrical power (Ref. 24-00-00).

(3) On pilots overhead circuit breaker panel CB1, zone 210, verify that the following applicable circuit breakers are closed:

ADPS-1:

THRUST REVERSE-ENG-1 (H16)

ENGINE BLEED CONTROL

CROSS BLEED VALVES-L (G17)

ENG ISLN VALVES-ENG-1 (G10)

ADPS-2:

ENGINE BLEED CONTROL

FUS ISLN VALVE (G16)

CROSS BLEED VALVES-L (G17), and -R (G18)

ADPS-3:

THRUST REVERSE-ENG-3 (H18)

ENGINE BLEED CONTROL

CROSS BLEED VALVES-R (G18)

ENG ISLN VALVES-ENG-3 (G12)

(4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215. verify that circuit breaker INDICATOR - PILOTS IND LT TEST - 2 (H9) is closed.

(5) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, verify that the following circuit breakers are closed:

ECS IND LT (G12)

BLEED AIR IND (R17)

(6) Turn on service interphone system (Ref. 23-43-00) to establish communications between the mid electrical service center and the flight station.

(7) Connect high pressure ground air (Ref. 36-13-00) to the following applicable ground air connection:

ADPS-1: Left side connection

ADPS-2: Center connection

ADPS-3: Right side connection

(8) Perform Flight Engineer/Second Officers station lights check (Ref. 33-17-00).

B. Functional Test

WARNING: ENGINE NO. 1, NO. 2, AND NO. 3 THRUST REVERSERS MUST BE LOCKED IN THE FORWARD THRUST POSITION (REF. 78-30-00).

(1) Perform preparation, Paragraph 3A.

(2) Activate air conditioning system (Ref. 21-00-00) in accordance with procedures for operation on high pressure ground air. Operate the following applicable air cycle pack:

ADPS-1: Pack No. 1

ADPS-2: Pack No. 2

ADPS-3: Pack No. 3

(3) On pilots center console under ALTERNATE CONTROLS cover, lift and hold for the remainder of the test the following applicable switch:

ADPS-1:

APU/GND AIR TO REVERSERS HOLD SWITCH-1

ADPS-3:

APU/GND AIR TO REVERSERS HOLD SWITCH-3

NOTE: This step is not required for ADPS-2 test.

(4) On Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, depress the following applicable switchlights and verify their flowbars come on:

ADPS-1:

NO. 1 ENGINE ISLN VALVE

Left CROSS BLEED

ADPS-2:

(fuselage) ISLN VALVE

Left and right CROSS BLEED

ADPS-3:

NO. 3 ENG ISLN VALVE

Right CROSS BLEED

(5) In mid electrical service center locate the air differential pressure switch to be tested under the following applicable floor panel:

ADPS-1 under 137AB

ADPS-2 under 137BB

ADPS-3 under 137CB

(6) Fully depress the test button, on the air differential pressure switch to be tested, for approximately five seconds and verify the following applicable flowbars go out and stay out when test button is released:

ADPS-1:

NO. 1 PACK FLOW CONTROL

NO. 1 ENG ISLN VALVE

Left CROSS BLEED

ADPS-2:

NO. 2 PACK FLOW CONTROL

NO. 2 HOT AIR

NO. 2 HOT AIR ISLN VALVE

ISLN VALVE (fuselage)

Right cross BLEED

Left cross BLEED

ADPS-3:

NO. 3 PACK FLOW CONTROL

NO. 3 HOT AIR

NO. 3 HOT AIR ISLN VALVE

NO. 3 ENG ISLN VALVE

Right CROSS BLEED

NOTE: This verifies that the air differential pressure switch excess flow contacts are operating.

(7) System Reset

(a) Unlatch affected system switchlights. Verify OFF legend comes on in ENG ISLN VALVE, CROSS BLEED, and HOT AIR switchlights.

NOTE: All affected switchlights must be unlatched at the same time to remove the valve locked circuit.

(b) Latch affected system switchlights. Verify OFF legends go off, flowbars come on, and valve operation is regained.

(8) If not further tests are to be performed, perform test completion,Paragraph 3C.

C. Test Completion

(1) Turn off air conditioning system (Ref. 21-00-00).

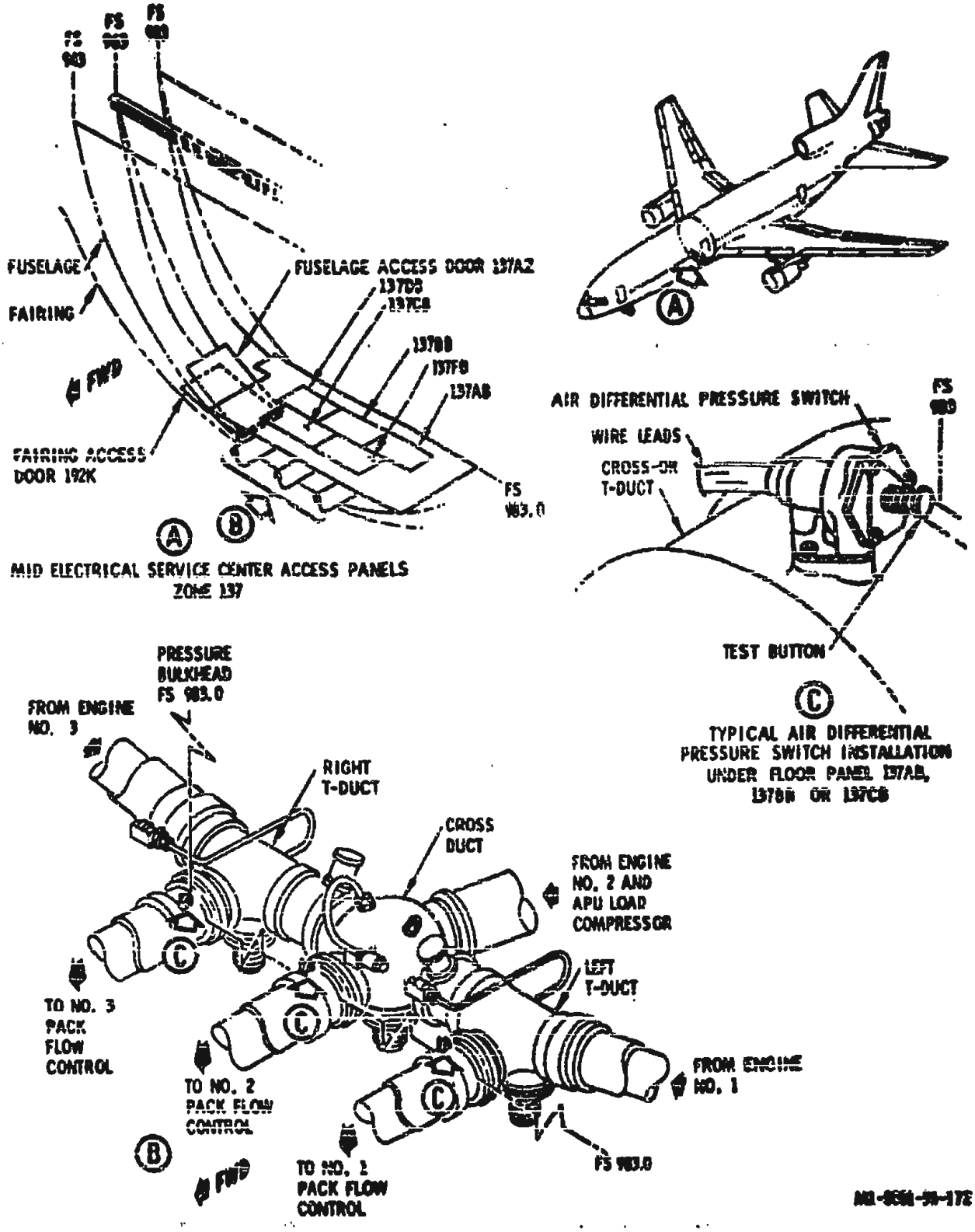
(2) Disconnect high pressure ground air (Ref. 36-13-00).

(3) Turn off service interphone system (Ref. 23-45-00).

(4) Unlock engine thrust reversers in forward thrust position (Ref. 78-30-00).

(5) Close and secure mid electrical service center hinged floor panels 137AB, 137BB, 137CB, 137DB, and 137FB and access doors 137AZ and 192K.

(6) Turn off electrical power (Ref. 24-00-00).



Air Differential Pressure Switch - Adjustment and Test
Figure 501

AFT CARGO COMPARTMENT AFT DUCT - REMOVAL AND INSTALLATION

1. General

The aft pneumatic duct is located in the left cheek area outboard of the aft cargo compartment, zone 163. Access is through aft cargo compartment vertical sidewall liner panels. Because of space restrictions, removal is through mid cargo compartment vertical sidewall liner panel.

2. Equipment and Materials

Protective caps

3. Referenced Procedures

6-40-00	Exterior Access Doors and Removable Panels
6-50-00	Aft Cargo Compartment Interior Panels
20-36-01	Single T-bolt V-band Coupling - Removal and Installation
21-00-00	Air Conditioning System - Maintenance Practices
21-44-03	Aft Cargo Compartment Heat Exchanger - Removal and Installation
25-51-06	Cargo Compartment Liner Panels - Removal and Installation
36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test

4. Removal/Installation

A. Removal

WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS BLEED (FE/SO) AIR AND APU CONTROL PANELS AND THE THREE
R HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT
R INADVERTENT SYSTEM OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF SYSTEM WILL REQUIRE PRECAUTIONS AGAINST HIGH TEMPERATURES, USE PROTECTIVE GLOVES WHEN REQUIRED.

CAUTION: BLEED AIR AREA OVERHEAT WARNING SYSTEM SENSORS (REF. 36-22-00) ARE INSTALLED NEAR DUCTS AND CARGO COMPARTMENT HEAT EXCHANGER. USE EXTREME CARE AT ALL TIMES TO AVOID DAMAGE TO SENSORS. WHEN NECESSARY, TO PREVENT SENSOR DAMAGE, DISCONNECT SENSOR SUPPORTS AND CAREFULLY MOVE SENSORS ASIDE. REPOSITION SENSORS AND REINSTALL SUPPORTS WHEN INSTALLATION IS COMPLETE.

R (1) Tag FE/SO bleed air and APU control panels and three external ground air connections to prevent inadvertent pneumatic system operation.

(2) Open access panel 316BB (Ref. 6-40-00).

(3) Remove T-bolt coupling (Ref. 20-36-01) aft of seal (Ref. Fig. 401).

(4) Remove base clamp from aft end of seal. Work seal aft off of duct.

(5) Remove aft cargo compartment heat exchanger (Ref. 21-44-03).

(6) In aft cargo compartment remove aft liner panel 161AR (Ref. 6-50-00 and 25-51-06).

(7) Remove T-bolt coupling, for waste tank compartment heating, from bleed air duct.

(8) Disconnect support clamp at forward end of duct, leaving open clamp on support structure.

(9) Remove duct by moving duct forward out through mid cargo compartment.

(10) Remove coupling and coupling cover for later installation.

(11) Install protective covers on ducts and heat exchanger.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) End of duct with slight bends goes aft. Slip T-bolt coupling and cover on end opposite bends.

(2) Move duct into position through mid cargo compartment.

(3) Slip duct through opening in aft bulkhead.

(4) Install forward end of duct loosely in support clamp.

(5) Align short duct with waste compartment heating duct.

(6) Install aft end of seal on bleed air duct so that edge of seal is a maximum of 0.20 inches from end of duct (Ref. Fig. 401 Sheet 2).

CAUTION: PRIOR TO TIGHTENING COUPLING, VERIFY DUCT IS ALIGNED SUCH THAT A MINIMUM CLEARANCE OF 1-INCH BETWEEN DUCT (0.50-INCH BETWEEN DUCT INSULATION), DUCT CLAMPS, TEE BOLTS AND NUTS, WIRE HARNESSES, HYDRAULIC LINES AND UNITS, SURROUNDING STRUCTURE AND ETC. IS MAINTAINED.

(7) Install T-bolt coupling aft of seal (Ref. 20-36-01).

(8) Install T-bolt coupling on short duct to waste tank compartment heater.

(9) Tighten duct support clamp.

NOTE: Use vertical and lateral adjustments of the supports and/or duct rotation to maintain required minimum clearances.

R (10) Connect source of high pressure, low temperature air to
R external ground connector No. 2. Adjust pressure to 50
R psi.

R NOTE: Leave warning flags in place.

R (11) In flight station, verify the following switchlight
R condition:

R NOTE: Leave warning tags in place.

R FE/SO ENGINE BLEED CONTROL panel

R Left and right CROSS BLEED unlatched, OFF legend
R on, flow bar off

R No. 2 PACK FLOW CONTROL unlatched, flow bar off

R No. 2 ENG ISLN VALVE unlatched, OFF legend on,
R flow bar off

R Aft fuselage ISLN VALVE latched, OFF legend off,
R flow bar on.

R FE/SO APU CONTROL panel

R BLEED AIR S/O unlocked, OPEN legend off

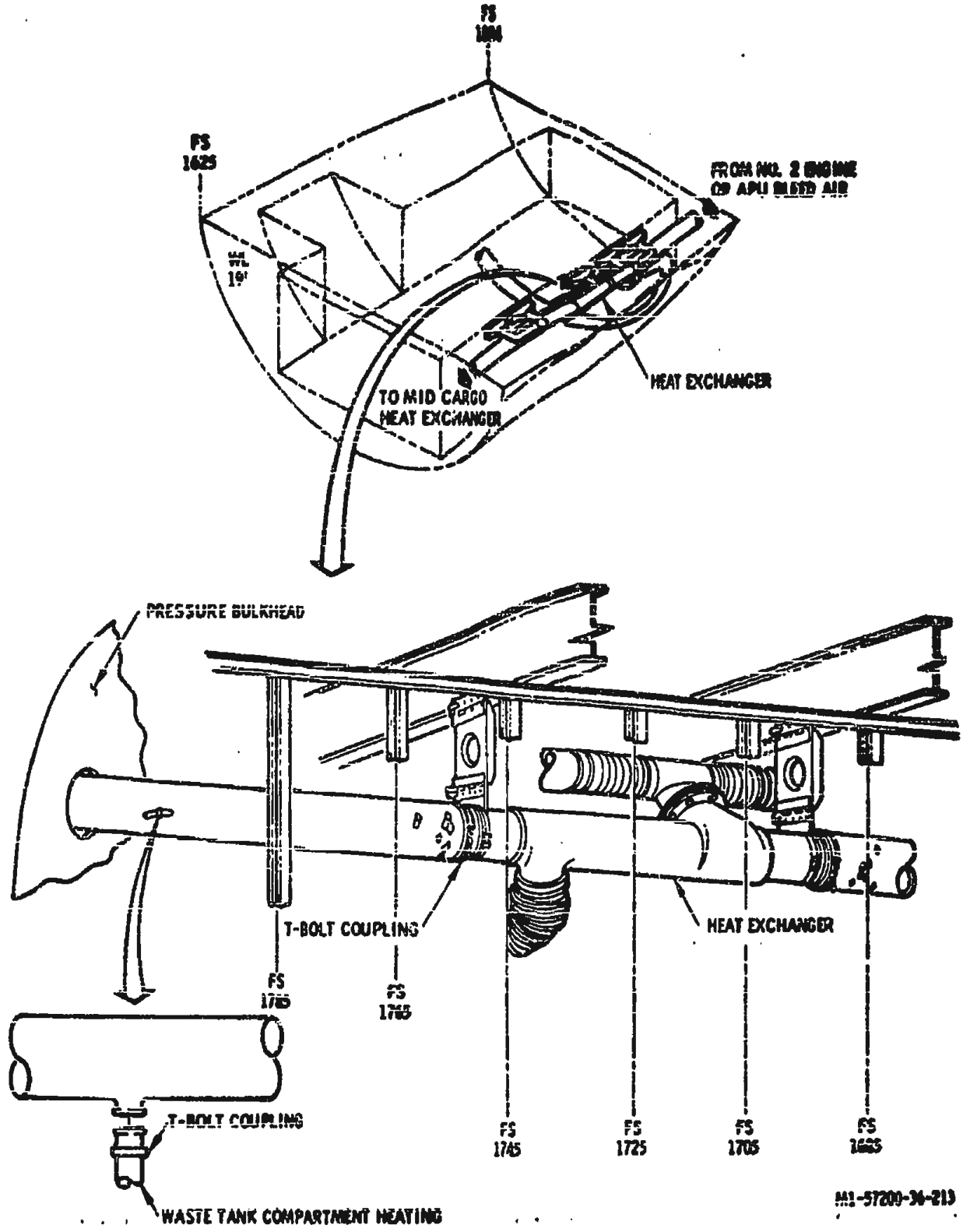
R (12) Check all connections for leaks. Correct as required.

R (13) Disconnect high pressure air source from external
R ground connector No. 2.

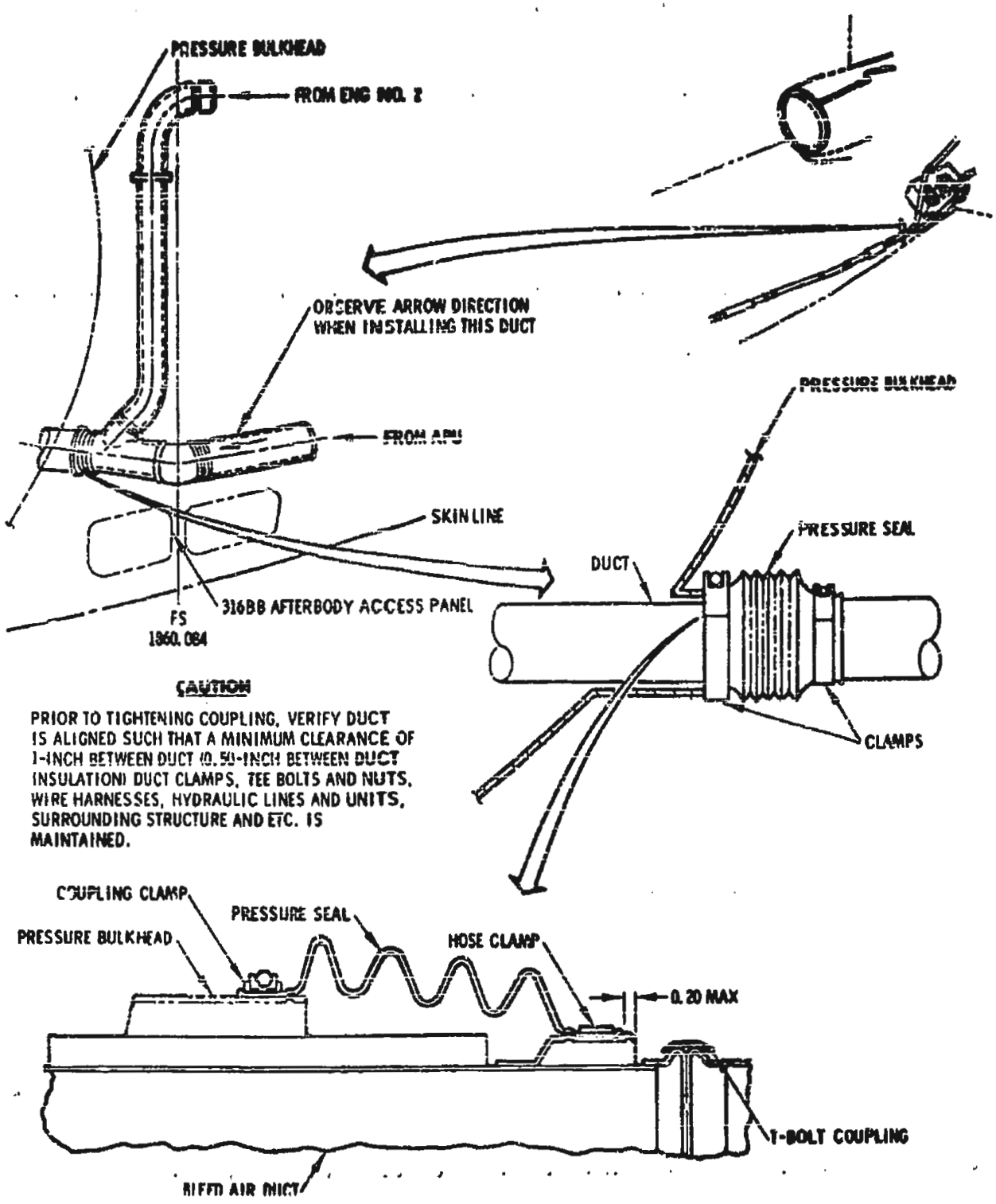
R (14) Install aft cargo compartment heat exchanger (Ref.
R 21-44-03).

R (15) Install all liner panels and close access panel opened
R in Step 4A(2).

R (16) Remove tags from FE/SO ENGINE BLEED CONTROL and APU
R CONTROL panels, and external ground air connections.



Aft Cargo Compartment Aft Duct - Removal and Installation
Figure 401 (Sheet 1)


PRESSURE BULKHEAD
FROM ENG NO. 2
OBSERVE ARROW DIRECTION WHEN INSTALLING THIS DUCT
FROM APU
SKIN LINE
316BB AFTERBODY ACCESS PANEL
FS 1860.084
CAUTION
PRIOR TO TIGHTENING COUPLING, VERIFY DUCT IS ALIGNED SUCH THAT A MINIMUM CLEARANCE OF 1-INCH BETWEEN DUCT (0.50-INCH BETWEEN DUCT INSULATION) DUCT CLAMPS, TEE BOLTS AND NUTS, WIRE HARNESSES, HYDRAULIC LINES AND UNITS, SURROUNDING STRUCTURE AND ETC. IS MAINTAINED.
PRESSURE BULKHEAD
PRESSURE SEAL
DUCT
CLAMPS
COUPLING CLAMP
PRESSURE SEAL
PRESSURE BULKHEAD
HOSE CLAMP
0.20 MAX
T-BOLT COUPLING
RIFFD AIR DUCT

Aft Cargo Compartment Aft Duct - Removal and Installation
Figure 401 (Sheet 2)

ENGINE NO. 2 PNEUMATIC DUCTS - REMOVAL AND INSTALLATION

1. General

The engine No. 2 pneumatic ducts are located in the afterbody aft of the aft pressure bulkhead, zones 314, 317, and 471.

2. Equipment and Materials

Protective caps

3. Referenced Procedures

	6-40-00	Exterior Access Doors and Removable Panels
	20-36-01	Single T-bolt V-band Coupling - Removal and Installation
	31-31-14	Engine Bleed Air Duct Temperature Sensor - Removal and Installation
	36-11-22	Bleed Air Overpressure Relief Valve - Removal and Installation
	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test
R	36-10-01	Overhaul Manual, Duct Repair

4. Removal/Installation

CAUTION: BLEED AIR AREA OVERHEAT WARNING SYSTEM SENSORS (REF. 36-22-00) ARE INSTALLED NEAR DUCTS. USE EXTREME CARE AT ALL TIMES TO AVOID DAMAGE TO SENSORS.

A. Removal - Engine Isolation Valve Remote Sense Line Duct

R WARNING: DO NOT START NOR OPERATE ANY ENGINE.

(1) In the flight station, install control column and trim wheel lock LAC P/N BA80.

(2) Tag FE/SO bleed air APU, and hydraulic system control panels and three external ground air connections to prevent systems operation.

(3) In the hydraulic service center, tag the hydraulic service panel to prevent operation.

(4) Gain access to afterbody mid section through access panel 317BB (Ref. 6-40-00).

R WARNING: RECENT OPERATION OF SYSTEM WILL REQUIRE
R PRECAUTIONS AGAINST HIGH TEMPERATURES USE
R PROTECTIVE GLOVES WHEN REQUIRED.

(5) Locate pneumatic duct above horizontal stabilizer at ceiling of compartment (Ref. Fig. 401).

R (6) When necessary to prevent bleed air area overheat
R system sensor damage, disconnect sensor supports and
R carefully move sensors aside.

R (7) Remove coupling cover and coupling (Ref. 20-36-01) from
R top of bellows.

R (8) Gain access to area above S-duct through access panel
R 313FR (Ref. 6-40-00).

R (9) Locate engine isolation valve remote sense line at FS
R 1987 and remove line.

R (10) Remove engine No. 2 bleed air duct temperature sensor
R (Ref. 31-31-14).

R (11) Remove coupling cover and coupling from duct at FS
R 2011.

R (12) Remove duct from duct support at FS 1990. Remove duct
R from aircraft.

R (13) Install protective covers on all duct openings.

B. Installation - Engine Isolation Valve Remote Sense Line Duct

R (1) Verify that tags previously installed on FE/SO air and
R APU control panels and the three high-pressure ground
R air connections are in place.

R (2) Remove protective covers from duct openings.

R (3) Install duct in duct support (Ref. Fig. 401).

R (4) Install coupling and coupling cover on aft duct joint
R (Ref. 20-36-01).

R NOTE: Position coupling on duct such that the
R protective covers can be installed with the
R velcro fastener down to allow fluids to escape.

R (5) Install engine isolation valve remote sense line.

R (6) Install engine No. 2 bleed air duct temperature sensor
R (Ref. 31-31-14). (7) In zone 317 install coupling and
R coupling cover.

R (8) Reposition disturbed sensors and reinstall supports
R when installation is complete. (9) Remove tags on
R FE/SO bleed air and external ground air connections
R installed in Step 4A(2).

R (10) Connect source of high pressure, low temperature air to
R external ground connector No. 2. Adjust pressure to 50
R psi.

R (11) On FE/SO ENGINE BLEED CONTROL panel verify aft ISLN
R VALVE switchlight is depressed, flowbar on.

R (12) Check all disturbed connections for leaks.

R (13) Close access doors opened in Steps 4A(4) and 4A(7).

R (14) Remove all tags and control wheel lock installed in
R Steps 4A(1) through 4A(3) and remove ground air source.

C. Removal - Pressure Relief Valve Duct

R WARNING: DO NOT START NOR OPERATE ANY ENGINE.

(1) Tag FE/SO bleed air and APU control panels and three external ground air connections to prevent systems operation.

R WARNING: RECENT OPERATION OF SYSTEM WILL REQUIRE
R PRECAUTIONS AGAINST HIGH TEMPERATURES, USE
R PROTECTIVE GLOVES WHEN REQUIRED.

(2) Open access panel 471AR (Ref. 6-40-00) remove pressure relief valve (Ref. 36-11-22).

R (3) When necessary to prevent bleed air area overheat
R sensor damage, disconnect sensor supports and carefully
R move sensors aside.

R (4) Remove coupling cover (Ref. Fig. 401) and coupling from
R aft end of duct at FS 2055 (Ref. 20-36-01).

R (5) Gain access to area above S-duct through access panel
R 313FR (Ref. 6-40-00).

R (6) Remove coupling cover and coupling from duct at FS2011.

R (7) Remove duct from aircraft.

R (8) Install protective covers on all duct openings.

D. Installation - Pressure Relief Valve Duct

(1) Remove protective covers from ducts.

(2) Install duct through access panel 313FR.

(3) Align duct (Ref. Fig. 401) through access panel 471AR and install coupling and coupling cover (Ref. 20-36-01).

R NOTE: Position coupling on duct such that the
R protective covers can be installed with the
R velcro fastener down to allow fluids to escape.

(4) Install pressure relief valve (Ref. 36-11-22). Do not install access panel.

(5) Install forward coupling and coupling cover.

R (6) Reposition disturbed sensors and reinstall supports
R when installation is complete.

R (7) Remove tags on FE/SO bleed air and external ground air
R connections installed in Step 4C(1).

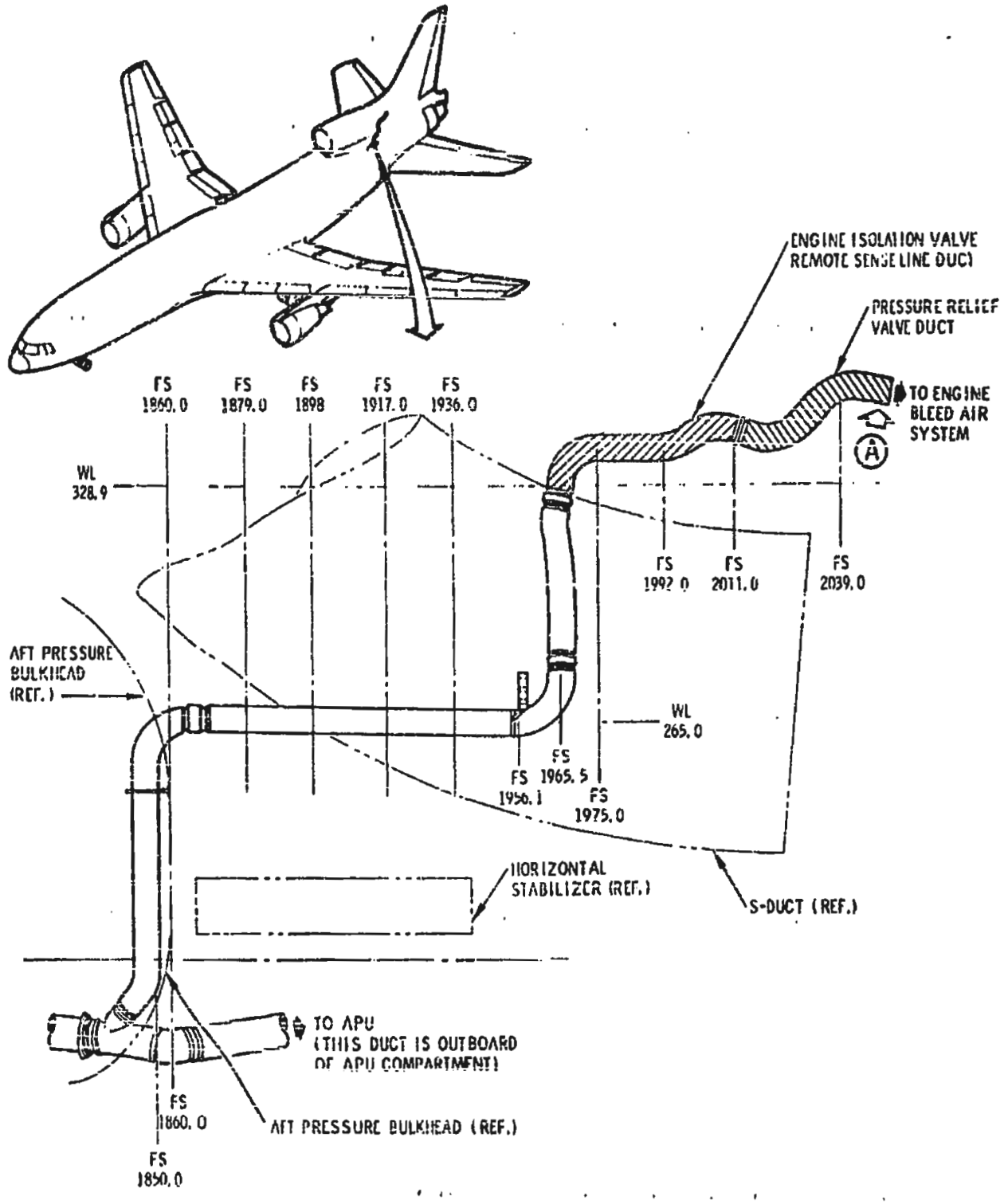
R (8) Connect source of high pressure, low temperature air to
R external ground connector No. 2. Adjust pressure to 50
R psi.

R (9) On FE/SO ENGINE BLEED CONTROL panel verify aft ISLN
R VALVE switchlight is depressed, flowbar on.

R (10) Check all disturbed connections for leaks.

R (11) Close access panels opened in Step 4C(2).

R (12) Remove all tags installed in Steps 4C(1) and remove
R ground air source.



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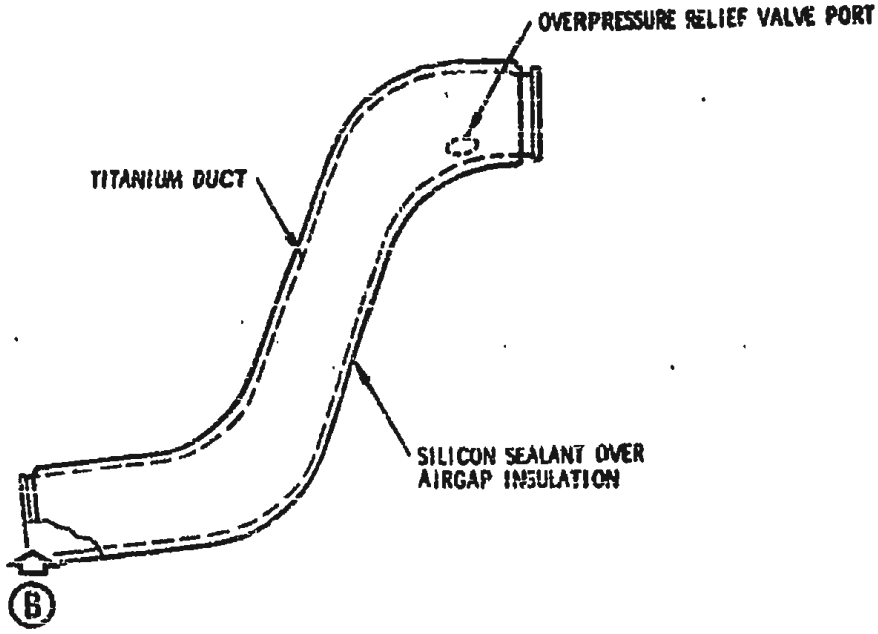
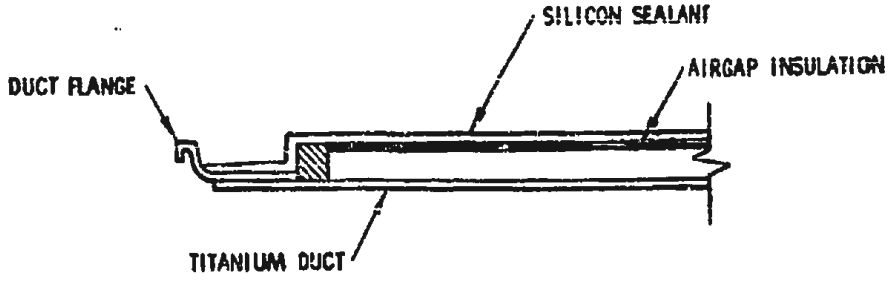
R Engine No. 2 Pneumatic Ducts - Removal and Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL



A

PRESSURE RELIEF VALVE DUCT



C

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R Engine No. 2 Pneumatic Ducts - Removal and Installation
R Figure 401 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

BLEED AIR PRESSURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

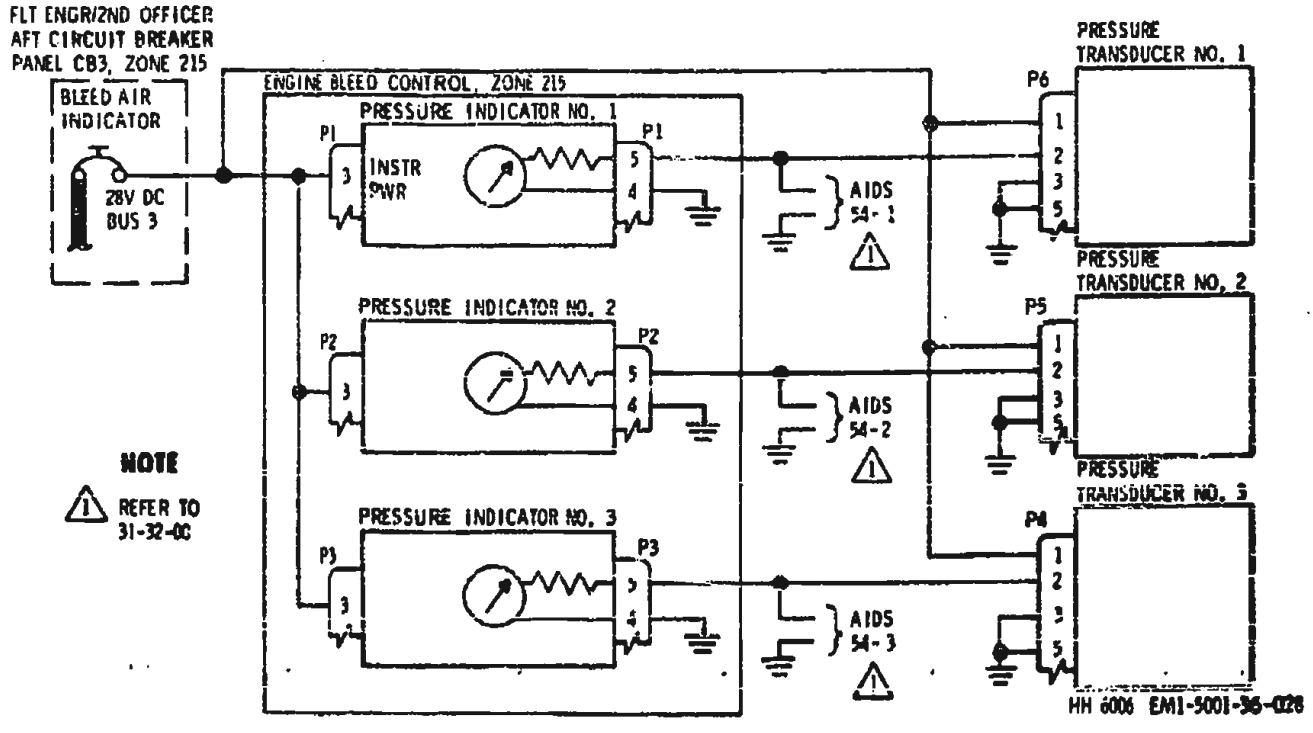
1. General

The bleed air pressure indicating system measures and indicates the pressure in each of the three bleed air ducts. The system consists of three pressure transmitters and three pressure indicators.

The transmitters for systems No. 1 and 3 are located on each side of the crossbleed manifold in the forward end of zone 142. The transmitter for system No. 2 is in the aft end of the hydraulic service center, zone 147. The pressure indicators are located on the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, zone 215.

The transmitter is a potentiometer (Ref. Fig. 1) that uses pressure to move its center arm. The output signal is 0-5V dc and is applied to the pressure indicator.

The pressure indicator receives an input signal from the transmitter to drive a pointer. Above 50 psig the signal is displayed on a compressed scale. Below 50 psig the scale is



R R Bleed Air Pressure Indicating System Schematic
Figure 1

expanded for easier reading. Both the indicator and the transmitter require 28V dc for operation.

BLEED AIR PRESSURE INDICATOR - REMOVAL AND INSTALLATION

1. General

Removal and installation procedures for the three bleed air pressure indicators are identical. The bleed air pressure indicators are located on the Flight Engineer/First Officers upper panel ENGINE BLEED CONTROL panel, zone 215, (Ref. Fig. 401).

2. Removal/Installation

A. Removal

R R R (1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker BLEED AIR IND (R17).

(2) Loosen roundhead screw next to bleed air pressure indicator to release clamp.

(3) Extract pressure indicator with attaching cable from panel.

(4) Disconnect cable connector from electrical connector in back of pressure indicator.

(5) Remove pressure indicator.

B. Installation

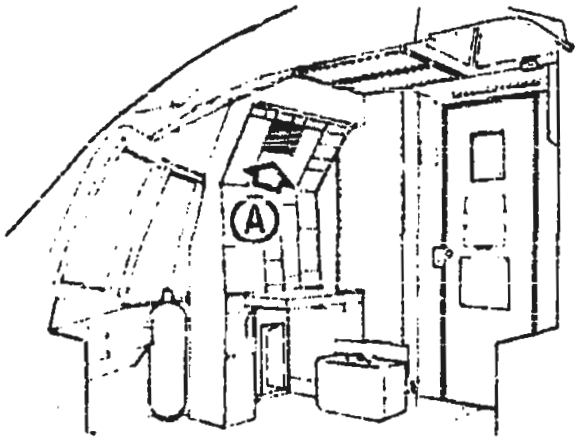
(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

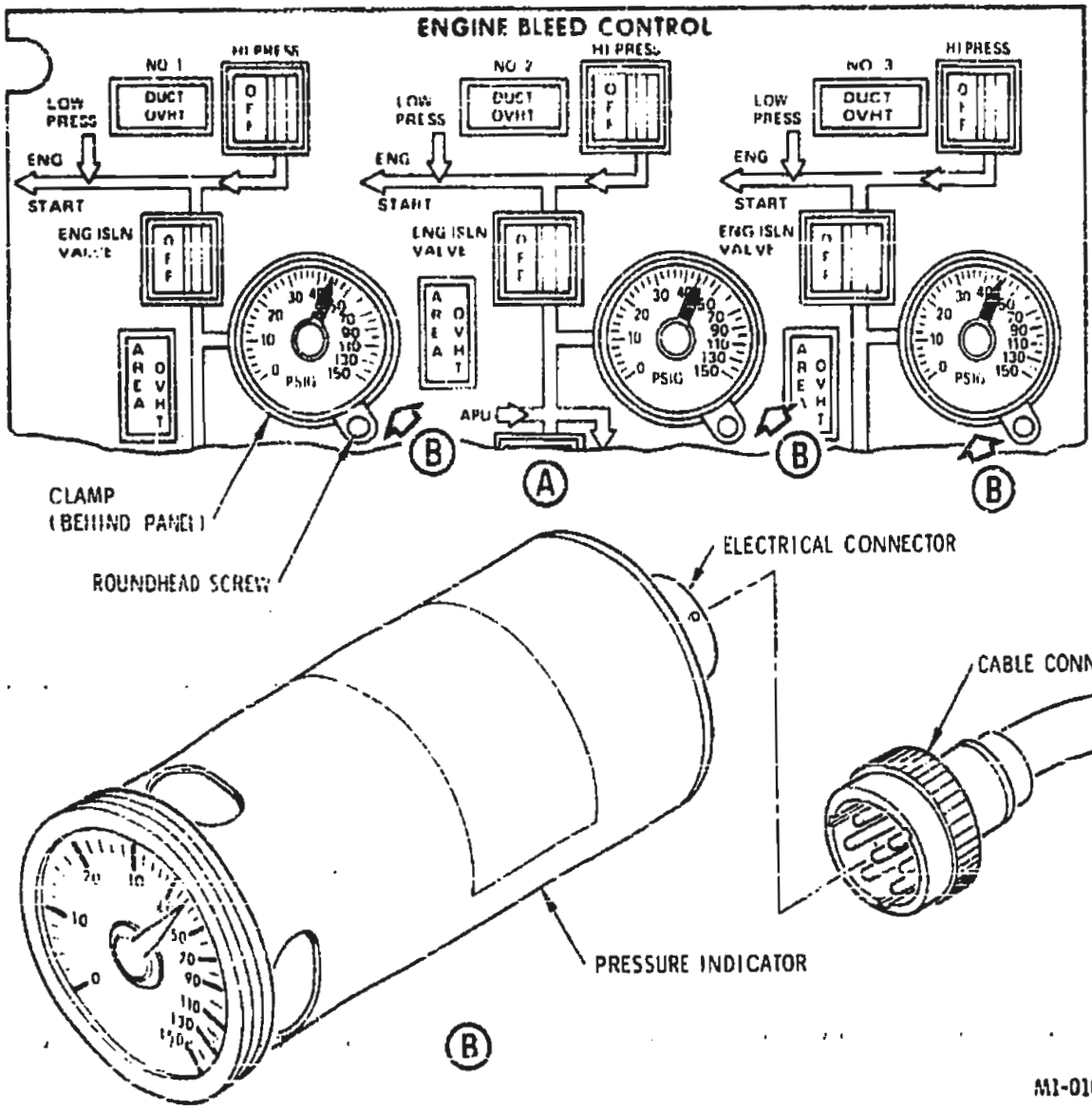
(2) Connect cable to electrical connector in back of pressure indicator.

(3) Slide pressure indicator and cable into panel.

(4) Torque roundhead screw 3 to 5 lb in. to tighten clamp on pressure indicator.

(5) Remove tag and close circuit breaker opened in Step 2A(1).





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R R Bleed Air Pressure Indicator - Removal and Installation
Figure 401

BLEED AIR PRESSURE TRANSDUCERS NO. 1 AND NO. 3 REMOVAL AND INSTALLATION

1. General

Removal and installation procedures are the same for the bleed air pressure transducers No. 1 and No. 3.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

3. Removal/Installation

R A. Removal

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR
R AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker BLEED AIR IND (R17).

(2) Remove access panel 142DB (Ref. Fig. 401).

(3) Disconnect electrical connector from pressure transducer.

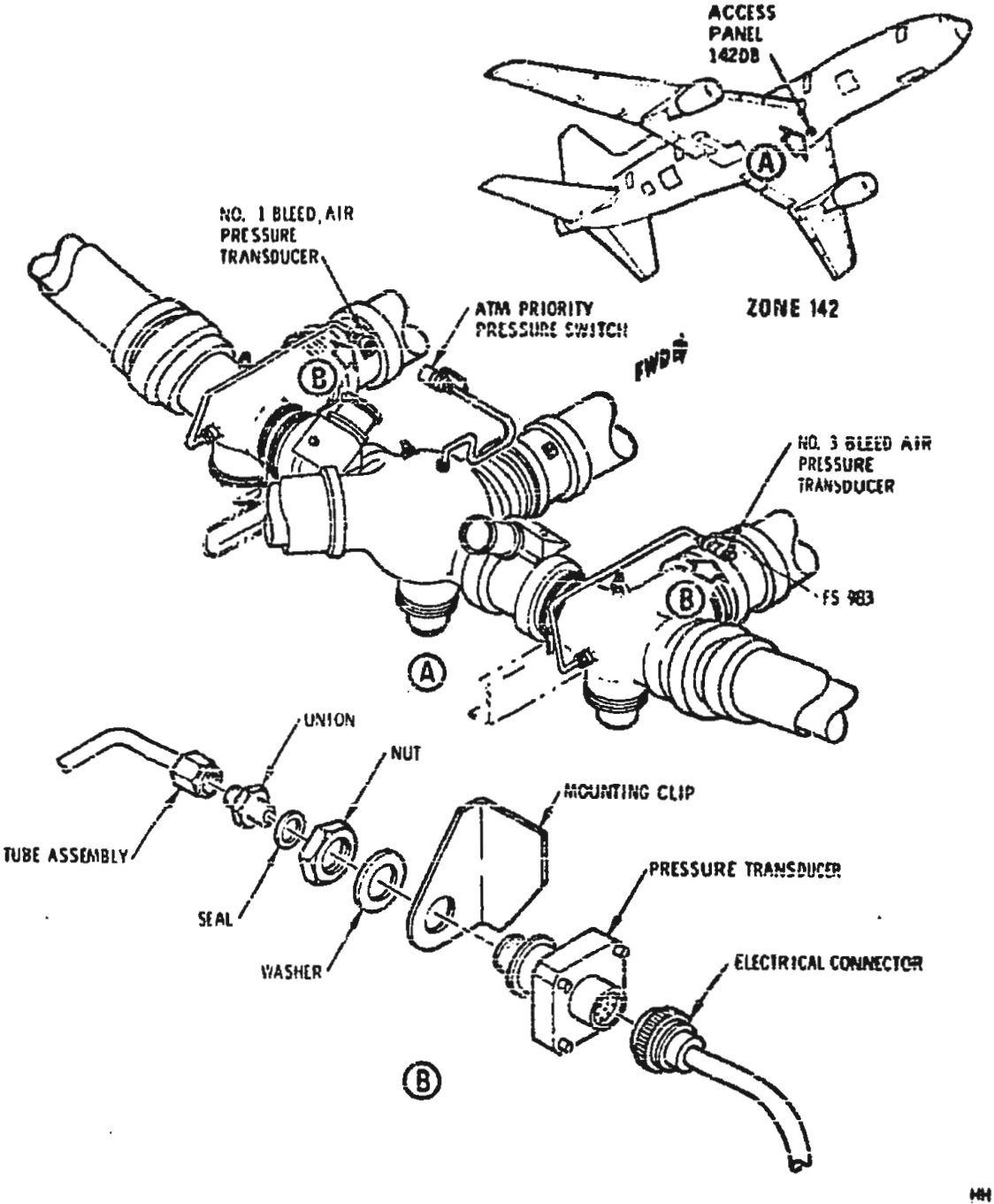
(4) Remove union and seal connecting tube assembly to pressure transducer.

(5) Loosen nut which secures pressure transducer to mounting clip.

(6) Remove pressure transducer, nut, and washer.

(7) Install protective cover over tube port.

B. Installation



R Bleed Air Pressure Transducer No. 1 - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Remove protective cover from tube port.

(3) Install pressure transducer through mounting clip and secure with nut and washer, and lock-wire.

(4) Install union and seal connecting tube assembly to pressure transducer.

(5) Install electrical connector to pressure transducer.

(6) Install access panel 1420B.

(7) Remove tag and close circuit breaker opened in Step 3A(1).

R (8) Remove tags installed in Paragraph 3A.

BLEED AIR PRESSURE TRANSDUCER NO. 2 - REMOVAL AND INSTALLATION

1. General

The bleed air pressure transducer No. 2 is located in the hydraulic service center compartment, zone 137.

2. Removal/Installation

R A. Removal

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR
R AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT OPERATION UNTIL
R COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker BLEED AIR IND (R17).

(2) Open hydraulic service center compartment access panel 147BB (Ref. Fig. 401).

(3) Disconnect electrical connector from pressure transducer.

(4) Remove union and seal connecting tube assembly to pressure transducer.

(5) Loosen nut which secures pressure transducer to mounting clip.

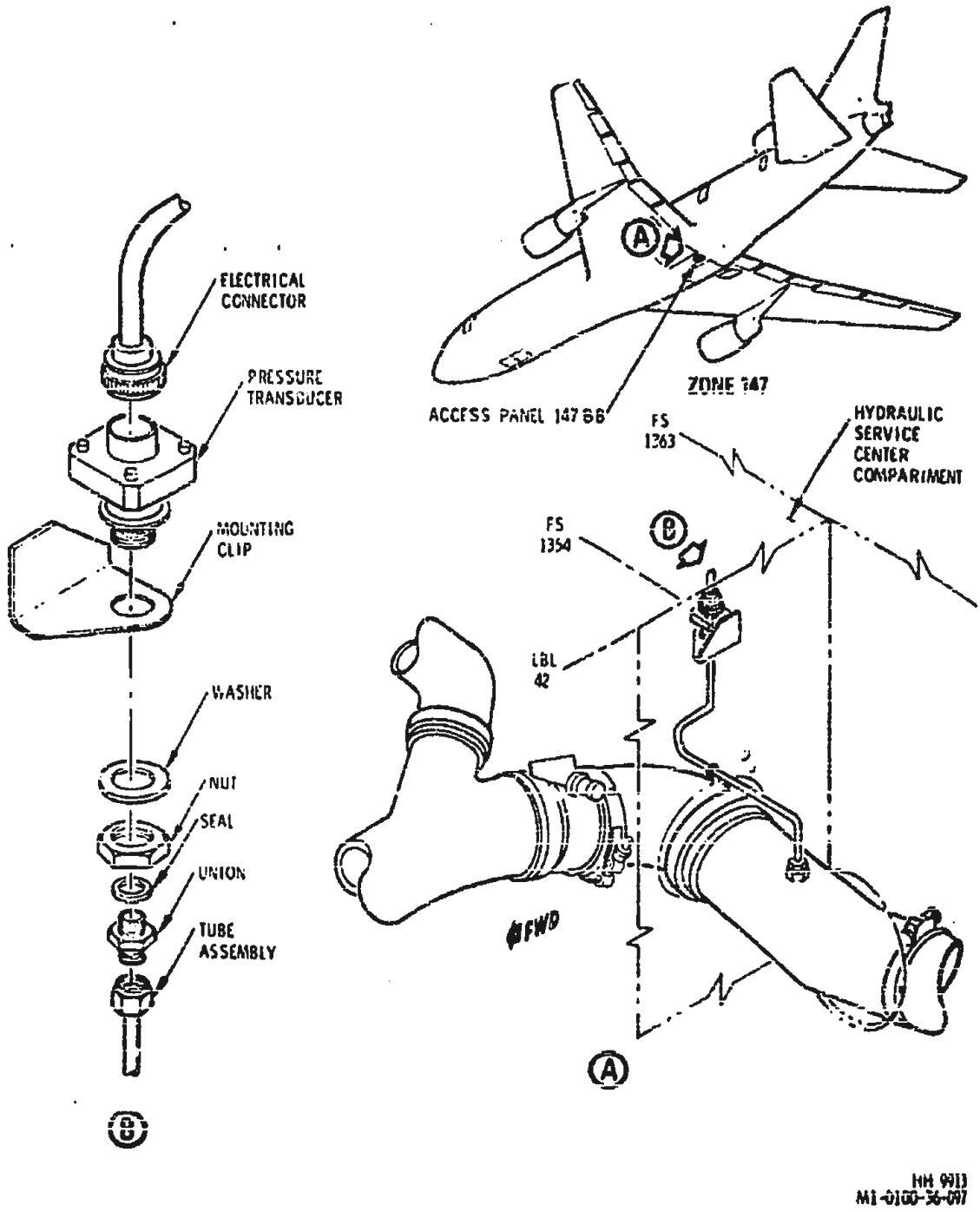
(6) Remove pressure transducer, washer, and nut.

(7) Install protective cover over tube port.

B. Installation

R WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO
R BLEED AIR AND APU CONTROL PANELS AND THE THREE
R HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that the circuit breaker opened in Step 2A(1) is open and tagged.



RR Bleed Air Pressure Transducer No. 2 - Removal and Installation
Figure 401

RR EFFECTIVITY: ALL

(2) Remove protective cover from tube port.

(3) Install pressure transducer through mounting clip and secure with nut and washer.

(4) Install union and seal connecting tube assembly to pressure transducer.

(5) Install electrical connector to pressure transducer.

(6) Close access panel 1478B.

(7) Remove tag and close circuit breaker opened in Step 2A(1).

R (8) Remove tags installed in Paragraph 2A.

BLEED AIR AREA OVERHEAT WARNING SYSTEM - DESCRIPTION AND OPERATION

1. General

The bleed air area overheat warning system detects hot air leakage from the bleed ducts. However, overheats within ducts are detected separately by overtemperature switches (Ref. 36-11-00).

R The system (Ref. Fig. 1) consists of two detection systems with a common area overheat detection controller assembly:

Fuselage and Wing Overheat Detection System

Engine Overheat Detection System

2. Overheat Sensor Elements

An overheat caused by leaking of a duct or pneumatic component in the fuselage, wing or engine bleed air system is detected by overheat sensor elements routed along the length of the ducts or in the area of the pneumatic component. For redundancy, ducts have two parallel elements running their length, loops A and B.

The sensor element consists of three parts; an electrically resistant wire to provide a signal to controlling circuits; a grounded conductor adjacent to the resistant wire; and a material between the resistant wire and the conductor with conductance that varies directly with temperature.

The temperature dependent material has low conductance at ambient temperature so that no electrical path exists between the resistant wire and the grounded conductor. But at high temperature, where the overheat occurs, the material becomes high in conductance, providing an electrical path between the resistant wire and the conductor.

The change in signal of the loop is interpreted by the controller as an overheat. For overheats in the wing or fuselage ducts, the controller measures and records the signal from the loop which can be used to determine location of fault.

Obviously if a sensor element is damaged and the resistant wire becomes grounded, the controller still interprets this as an overheat at the point of ground. But since only one loop indicates an overheat, it can be inferred that the loop is faulty if corrective action does not eliminate the fault indication.

3. Fuselage and Wing Overheat Detection System

The fuselage and wing overheat detection system consists of nine area parallel sensor loops (channels A thru H and J), the overheat controller, and a distance meter (Ref. Fig. 2).

If a fuselage or wing anti-ice duct develops a leak or any of the cargo heat exchangers reach excessive temperatures, caution lights on the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel or pilots overhead ANTI-ICE panel and pilots instrument panel caution and warning annunciator AREA DUCT/OVHT come on.

A number corresponding to the location of the overheat detected by the sensor loop is then automatically displayed on the distance meter on the top of the overheat controller. An interlock circuit prevents erroneous alarms from neighboring area, fwd of pack flow control valves.

On aircraft 001-033 with SB21-214, and 034-999, another interlock circuit prevents erroneous alarms in the area under the MESC floor.

When a loop overheat fault occurs, a low resistance signal is coupled to the overheat controller. The controller provides a 28 volt signal through the ILCB to turn on an associated indicator light.

On aircraft 001-033 without SB21-214, channels A, B and C light signals are interlocked through relays in the controller interlock circuit, the other light signals (Channel D, E, F, G, H and J) drive associated lights directly (Ref. Fig. 1 and 4).

Duct overheat protection is described under pack high flow in Chapter 36-14-00.

On aircraft 001-033 with SB21-214, and 034-999, channels A, B and C light signals are interlocked through relays in the controller interlock circuits, channels D, E, and H light signals are interlocked through relays in the overheat protection relay assembly, the other light signals (channels F, G and J) drive associated lights directly (Ref. Fig. 1 and 4).

A. Location Circuits

The controller assembly not only detects an overheat condition and lights the appropriate indicator but also helps locate it along any sensing element. A numerical readout is provided and can be used to locate an overheat condition within ±10 percent of loop length. The displayed
R number can be converted with a chart (loop length to feet)

to indicate the distance from the beginning of the sensing element loop to the overheated location.

The location circuit uses a 25Hz counter to position a distance meter. At the receipt of the loop fault, the 25Hz counter starts counting. The location circuit stops the counter at a time proportional to the resistance of the loop. This is proportional then to the location of the fault. Therefore, the readout on the indicator can be converted to the location of the fault by referring to the fault location chart on the front of the controller assembly (Ref. Fig. 3).

C NOTE: If the counter is damaged or otherwise inoperative,
C as the area overheat controllers transit the MCI
C Electrical Shop, the malfunctioning counter and reset
C switch will be deleted and the holes in the lid
C covered.

Counter reading can be used to locate the fault within ten percent of sensing loop length on a long sensing loop channel. Fault location counter readings should not be used on element loops of less than twenty feet since location circuits are very inaccurate for such short lengths.

For maximum accuracy, the system should be operated with the loop selector switch in the BOTH position. Also the interlock reset push button switch must not be activated during overheat isolation counting. If the system is in a single loop position (A or B) when the fault occurs, the indicator will record approximately twice the value it should to indicate a proper location. Correction is made by dividing the reading by two and then making the normal computation.

When an overheat occurs, none of the system operating switches should be activated for 16 seconds. This allows counter to record the location of the fault. The location circuit can be overridden in an emergency, before expiration of the 16 second interval by operating the interlock reset button and/or the loop selector switch. This action results in an erroneous number on the count indicator and prevents accurate location of the fault and is, therefore, not recommended.

The location system locates and records only the first overheat fault without resetting. However, the detection system countinues to function as an alarm indicator regardless of the number of overheat faults detected. Readout of the EVENTS counter remains displayed, once energized, until manually reset. Power interruptions or complete loss of power does not change the reading.

Two buttons on the cover of the Overheat Controller Assembly permit resetting the alarm location circuitry after a fault has been sensed. One mechanically resets the counter to zero and is an integral part of the counter. The second button is a RESET pushbutton switch. When the switch is depressed, reset relay in the interlock assembly is energized, resetting the circuits. Both pushbuttons and tamper proof cap are safety wired together to prevent activation until the distance meter reading has been recorded.

B. Interlock circuit

Because the three forward fuselage ducts (channels A, B, and C) are so close, a leakage in one could appear as a leakage in the others.

R On aircraft 001-033 with SB21-214, and 034-999, because the three wing ducts and crossbleed manifold channels D, E and H are so close, a leakage in one could appear as a leakage in the others. This type of false second alarm is prevented by the interlock relays circuit in the controller. All three PACK FLOW CONTROL switchlights on the CABIN TEMP CONTROL panel must be depressed and latched before the interlock circuit becomes active.

If the center duct, to pack No. 2, (channel B) develops a leak, the detection and alarm circuit detects the leak and energizes the alarm relay. When the relay closes, power is applied through the normally closed contacts of the channel B interlock relay. This turns on the location circuits and the AREA OVHT lights. Also, power is applied from channel B alarm line through two diodes to open channel A and C interlock relays, opening the lines to the channel A and C caution lights. The line to all of the monitor/distance relays except channel B are also opened. This deactivates the channel A and C monitor distance circuits.

When the No. 2 PACK FLOW CONTROL switchlight is depressed and released, the ground for the three interlock relays is removed. This deactivates the interlock circuit and allows the other overheat detection channels to become active again. The distance meter is not reset by the interlock relays.

The interlock circuit operates in the same way for channel B. If channel A or C detect a leak, the interlock relays turn off the other two channels.

R On aircraft 001-033 with SB21-214, and 034-999, channels D, E, and H are connected to a set of interlock relays that perform the same function as channels A, B and

R C. Channels D, E and H are also connected to the Pack High
R Flow Lockout System (Ref. 36-14-00), to shut all valves
R supplying hot air in the MESC underfloor area. There is a
R possibility that overheat lights for channels A and D, and
R channels B and H will come on together if an overheat
R condition or duct rupture occurs in the MESC underfloor area
R between FS 943 and 963, since these systems overlap at this
R point (Ref. 36-22-02).

C. Loop Selection

Each area sensor channel has two parallel temperature
R sensing element loops connected through a loop selector
R switch in the overheat controller. The sensor loops are installed adjacent to the monitored duct. If one sensing element loop fails, the other loop can be used for full protection.

A single three-position switch on the CABIN TEMP CONTROL panel on the Flight Engineer/Second Officers upper panel is used for loop selection. Normally the loop selector switch is set to BOTH. In this position, both ends of all sensing element loops are tied together in parallel. When the loop selector switch is set to A or B, only the loop selected will be used as the sensing element and the other loop is disconnected.

D. TEST Switch

The TEST switch, next to the loop selector switch, when depressed, energizes all of the test relays to ground one end of all of the sensing elements. This simulates an overheat condition. The detection and alarm circuits should turn on all of the alarm relays if all sensor elements in the loop selected are intact. Thus, all seven AREA OVHT lights on the ENGINE BLEED CONTROL panel, and the two DUCT FAIL lights come on.

E. Cargo Compartment Heat Exchanger

The cargo compartment heat exchanger includes thermal switches.

If a bleed air leak occurs in the forward cargo compartment heat exchanger, the thermal switch closes and turns on all three forward fuselage AREA OVHT lights. The distance meter is inactive for this part of the circuit.

If a bleed air leak occurs in either the center or aft heat exchangers, the thermal switches close and energize channel J. The switches are electrically connected to the far end of channel J. An overheat or a thermal switch short will

turn on the AREA OVHT light for the aft fuselage channel J. The distance meter on the overheat controller then reads maximum length.

F. Wing Anti-ice

The wing anti-ice circuits, channels F and G, function about the same as the mid fuselage circuits function. The only real difference is that the DUCT FAIL caution lights are on the WING ANTI-ICE panel.

On aircraft 001-006 without SB30-012, another difference is the DUCT FAIL lights can also be turned on by the anti-ice system controller (Ref. 30-13-00).

4. Engine Overheat Detection System

Each engine has a completely independent engine overheat detection system. The system uses sensor loops and detection circuits similar to the fuselage and wing overheat detection system. A major difference between the two systems is that the engine overheat detection system does not use the distance meter. Also, an overheat condition closes the engine high-pressure valve, and lights a separate dual caution light for the affected engine. These lights are on the NACELLE/PYLON OVHT DET TEST panel at the top of the Flight Engineer/Second Officers upper panel. This panel also includes a loop selector switch for each engine and the TEST switch.

When the loop selector switch is set at BOTH, power is supplied to two separate alarm circuits that monitor both loops A and B. If either loop detects an overheat condition, the alarm circuit will activate a relay to shut off the high pressure bleed air valve (Ref. 36-11-00). The alarm circuit also turns on the ENG OVHT light of the corresponding loop. When a duct ruptures and the system is working properly, both loops A and B alarm circuits should activate, turning on both the A and B ENG OVHT lights. Also, the NACELLE OVHT light on the pilots caution and warning panel should come on. But with the selector switch at BOTH, if only one loop detects an overheat or if a loop is shorted, the corresponding ENG OVHT light comes on but the NACELLE OVHT caution and warning light does not come on.

When the selector switch is set to A or B, only the alarm circuit for the selected loop has power. Then if an overheat condition or a short occurs in the selected loop, the alarm circuit shuts off the high pressure bleed air valve, turns on the corresponding ENG OVHT light and turns on the NACELLE OVHT light.

Table 1 show conditions which cause Engine High Pressure Bleed Air Valve to close and Nacalle/Pylon Panel lights to come on.

Nacelle/Pylon Overheat Operation
Table 1

SELECT SWITCH	LOOP A	LOOP B	ENG HI PRESS BLEED AIR VALVE	NACELLE/PYLON OVHT DET TEST PANEL LT A	NACELLE/PYLON OVHT DET TEST PANEL LT B	PLTS C/W PANEL NACELLE OVHT LT
BOTH	OVHT OR SHORT	OVHT OR SHORT	CLOSE	ON	ON	ON
BOTH	OVHT OR SHORT	NORMAL	CLOSE	ON	OFF	OFF
BOTH	NORMAL	OVHT OR SHORT	CLOSE	OFF	ON	OFF
BOTH	NORMAL	NORMAL	OPEN	OFF	OFF	OFF
A	OVHT OR SHORT	NO EFFECT	CLOSE	ON	OFF	ON
A	NORMAL	NO EFFECT	OPEN	OFF	OFF	OFF
B	NO EFFECT	OVHT OR SHORT	CLOSE	OFF	ON	ON
B	NO EFFECT	NORMAL	OPEN	OFF	OFF	OFF

There is a separate loop selector switch for each engine and a single TEST pushbutton for pre-flight and in-flight integrity testing. When the TEST pushbutton is depressed the test relay is energized to connect one end of each loop sensor, for all three engines, to ground. The grounded sensors energize the alarm relays and turn on the caution and warning lights. The test relay also disconnects the ground to the bleed air shutoff relay so that the high-pressure valve will not close during a test.

A. No. 1 and 3 Engine Areas

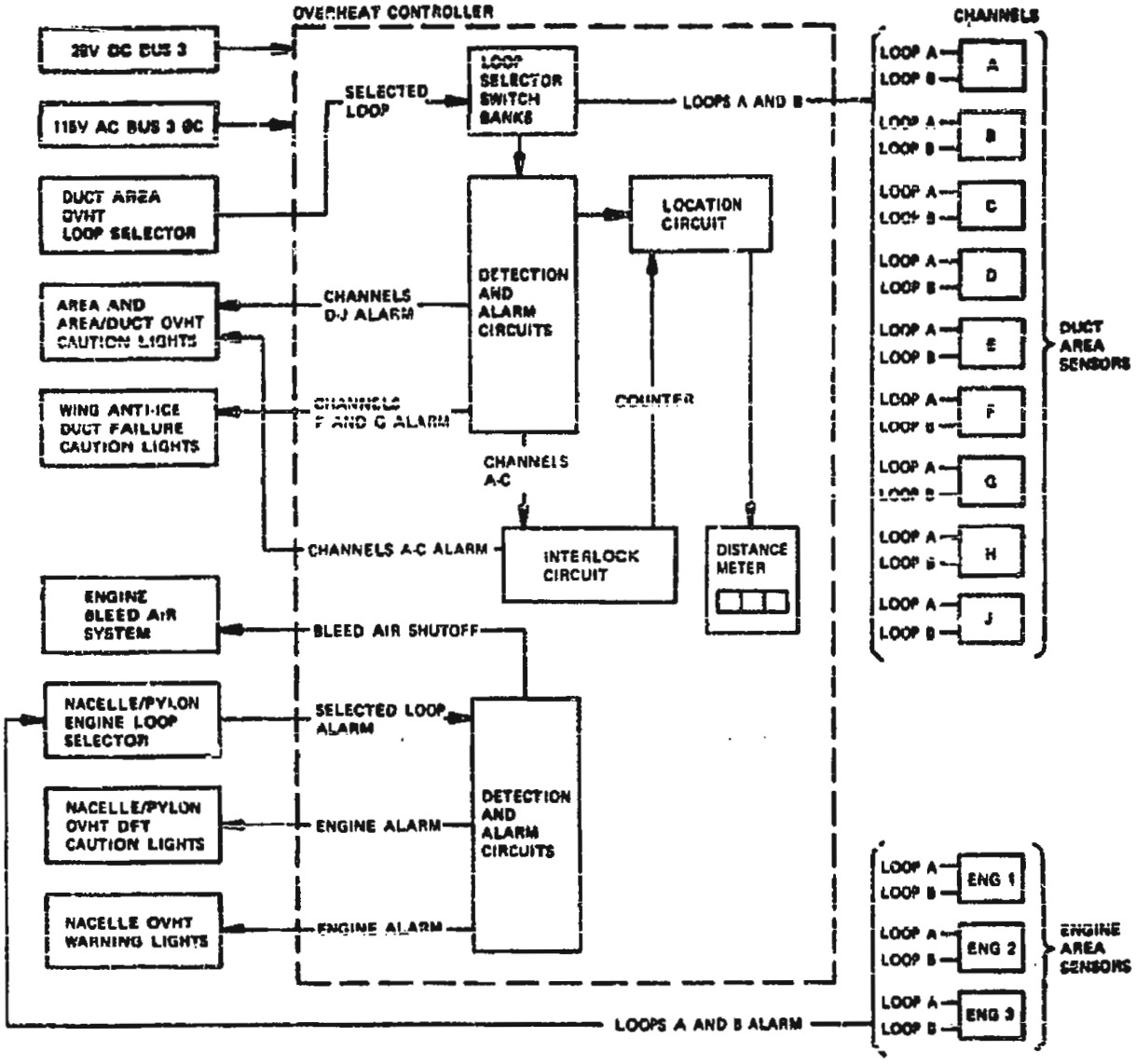
On aircraft 001-031,
the No. 1 and 3 engine areas sensor locations are identical,

(Ref. Fig. 2). Each engine and pylon loop consists of two sensor elements connected in series to form loop A and two elements in series for loop B. Sensor element pairs are located in the following engine areas: Engine splitter compartment (zone 3) and the pylon. The pylon is set at 242 to 268 degrees F (117 to 131 degrees C) and zone 3 is set at 305 to 315 degrees F (152 to 157 degrees C).

On aircraft 032-999,
TheNo. 1 and 3 engine areas sensor locations are identical, (Ref. Fig. 2). Each engine and pylon loop consists of two sensor elements connected in series to form loop A and two elements in series for loop B. Sensor element pairs are located in the following engine areas: Engine splitter compartment (zone 3) and the pylon. The pylon is set at 250 to 259 degrees F (121 to 126 degrees C) and zone 3 is set at 305 to 315 degrees F (152 to 157 degrees C).

B. No. 2 Engine Area

There are three pairs of sensor elements for the No. 2 engine areas. One pair is the engine splitter compartment (zone 3), another pair is above the engine accessory compartment and below the center engine support structure (CESS), and another pair in the engine support structure. There are three sensor elements connected in series to form loop A, and three elements in series to form loop B. The sensor elements in zone 3, center engine support structure (CESS) and engine interface are set at 305 to 315 degrees F (152 to 157 degrees C).



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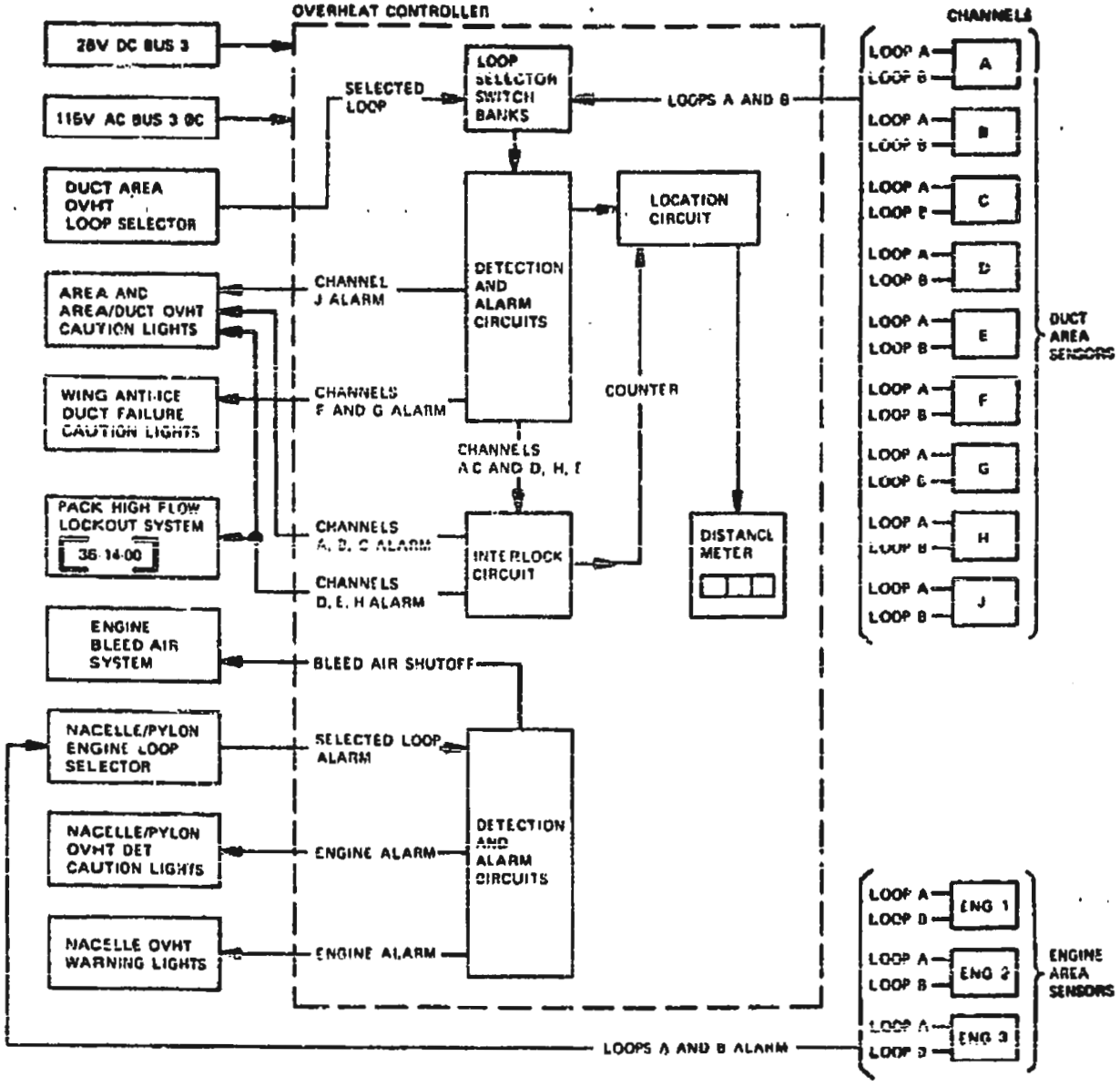
Bleed Air Overheat Warning System, Block Diagram
Figure 1



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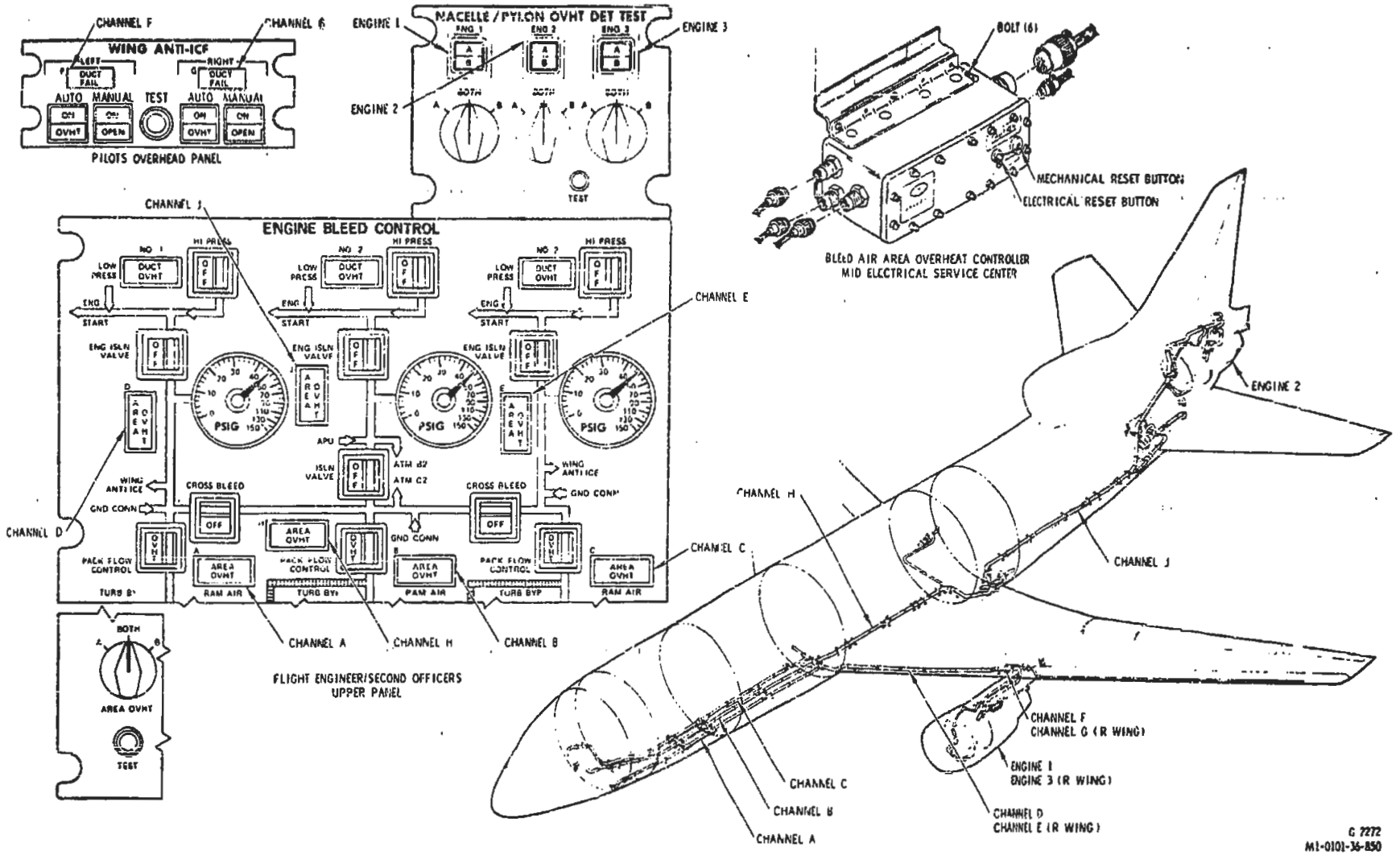
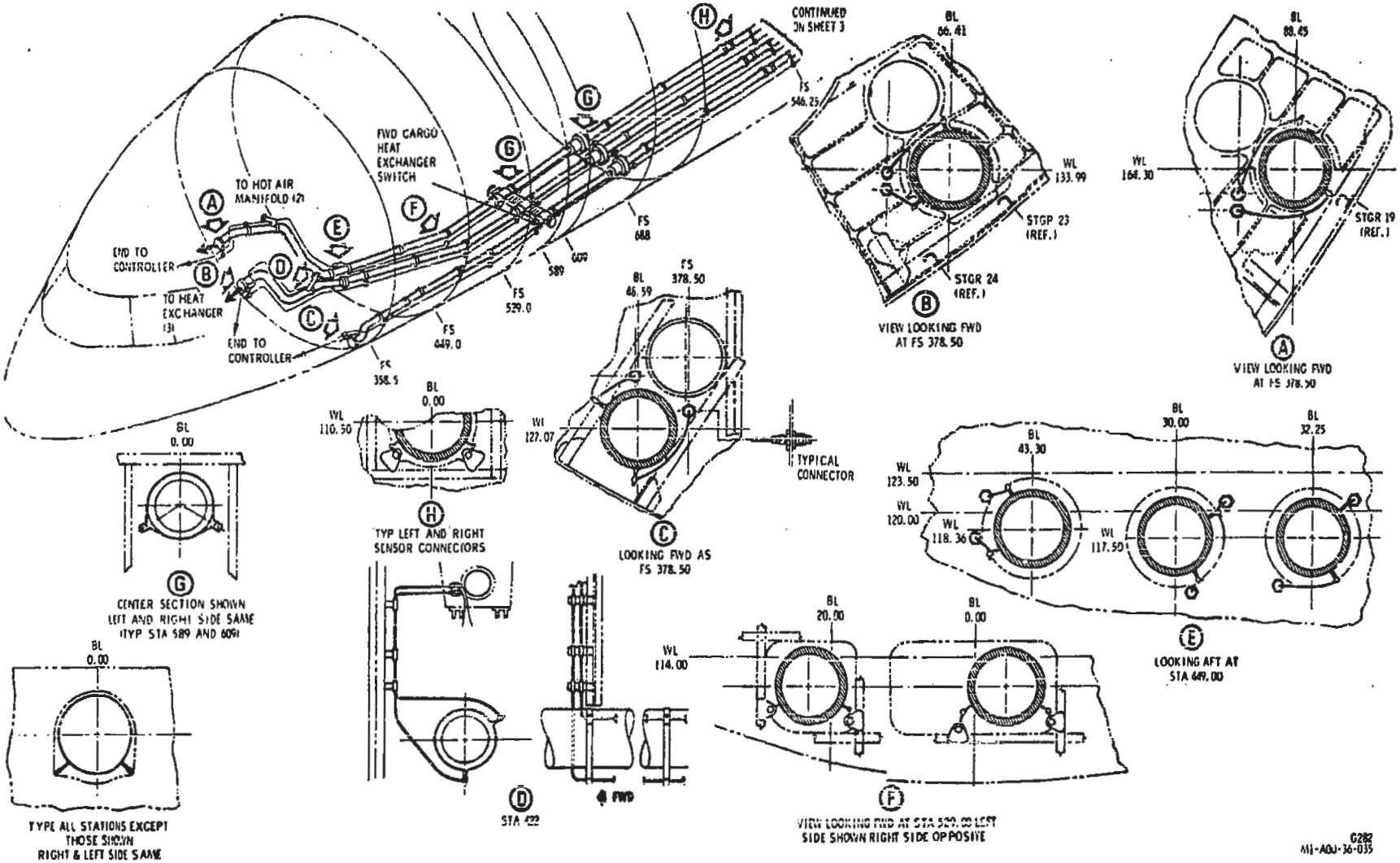
Bleed Air Overheat Warning System, Block Diagram
Figure 1



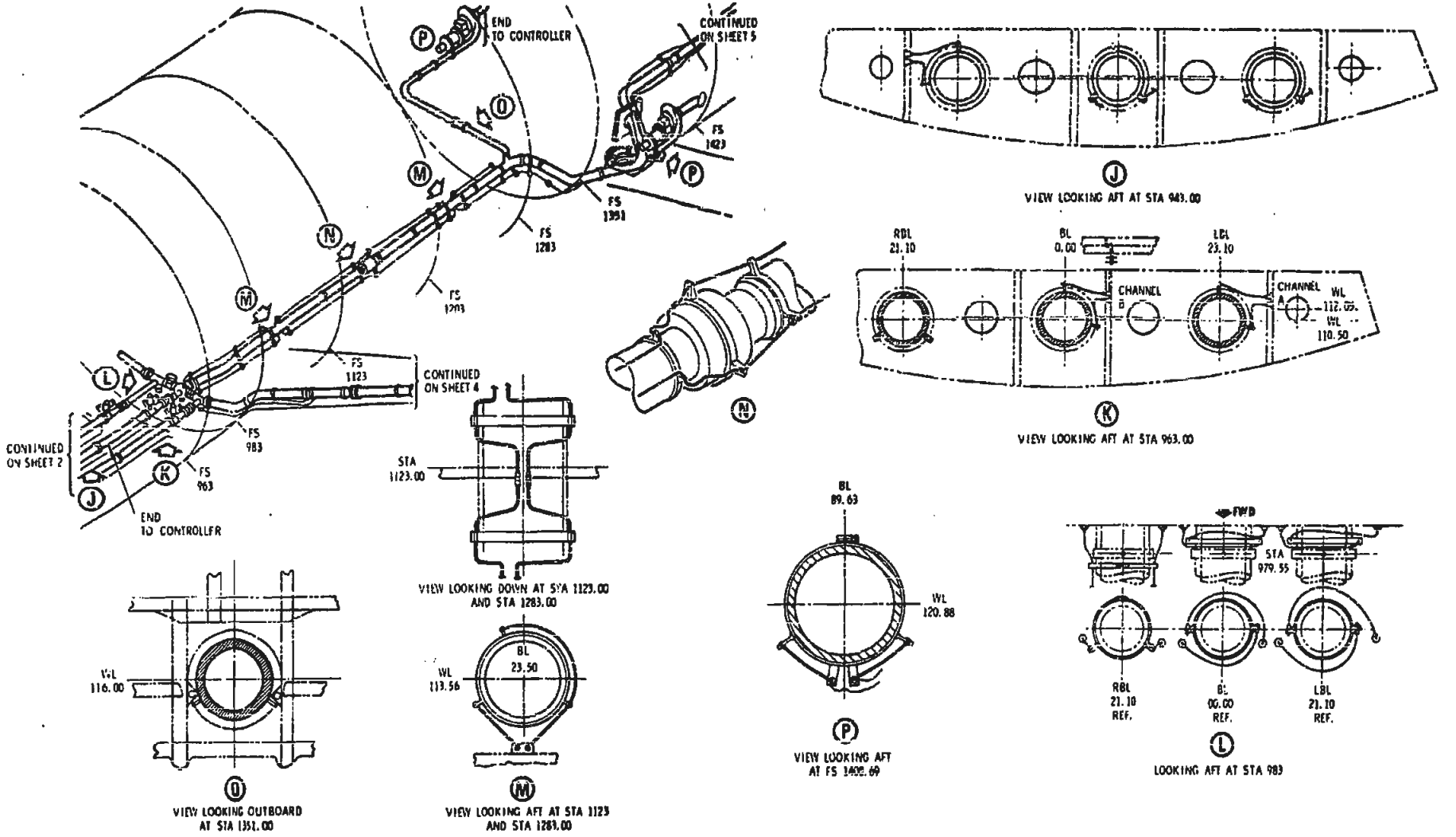
Bleed Air Area Overheat System Component Locations
Figure 2 (Sheet 1)

R EFFECTIVITY: ALL
R
0018



Bleed Air Area Overheat System Component Locations
Figure 2 (Sheet 2)

R
R
0018 EFFECTIVITY: ALL



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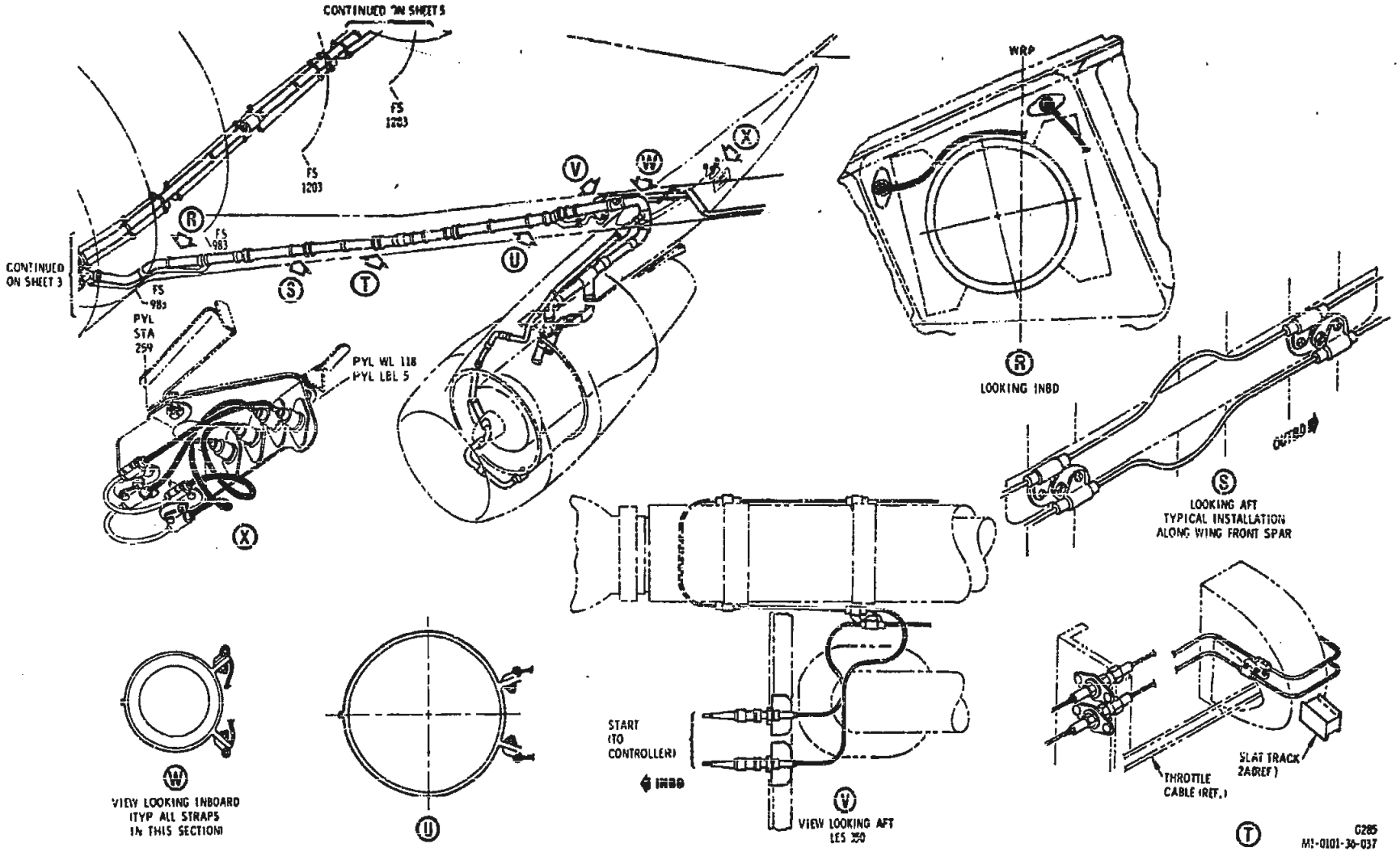
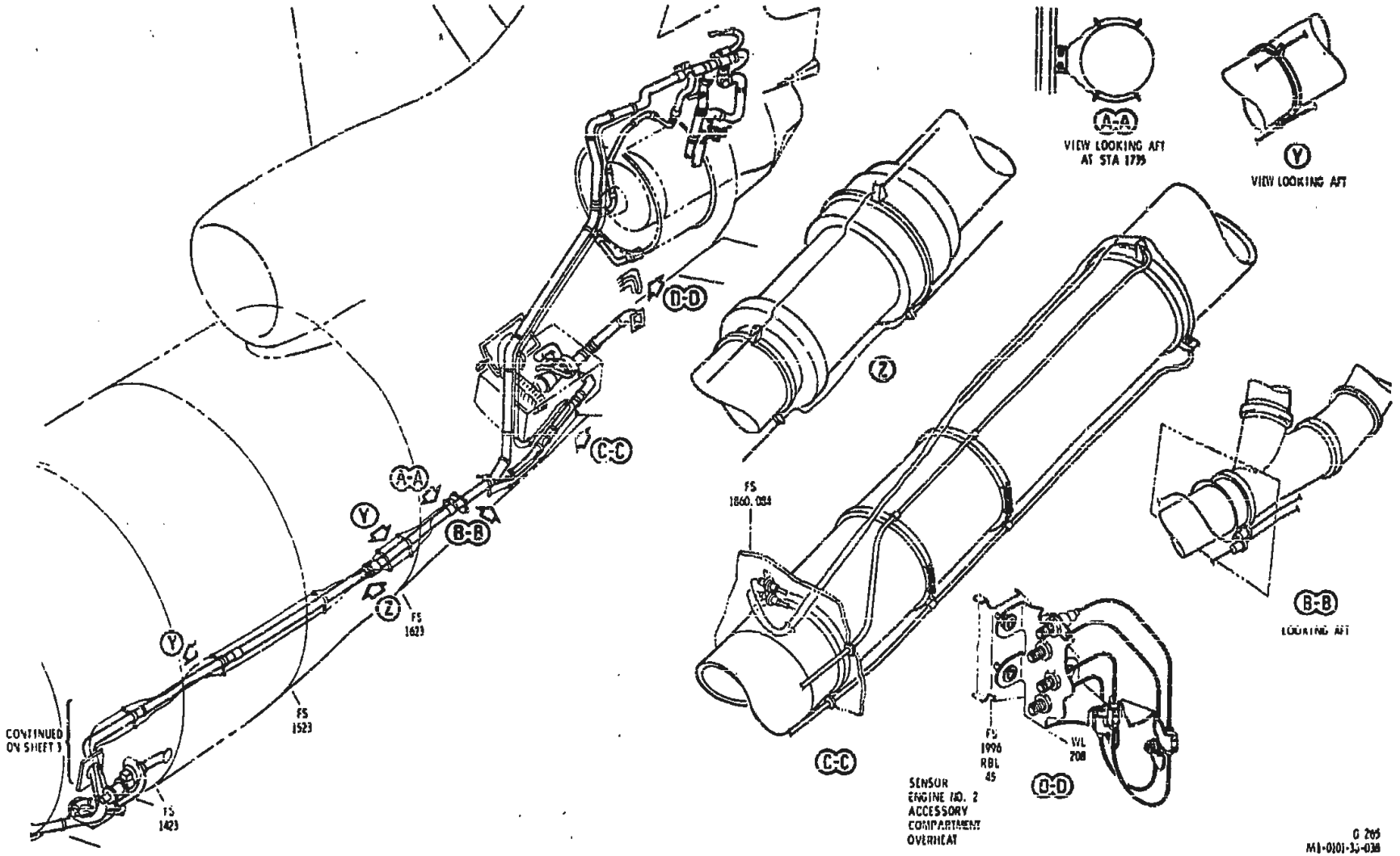
Bleed Air Area Overheat System Component Locations
Figure 2 (Sheet 3)

R EFFECTIVITY: ALL
R
0018

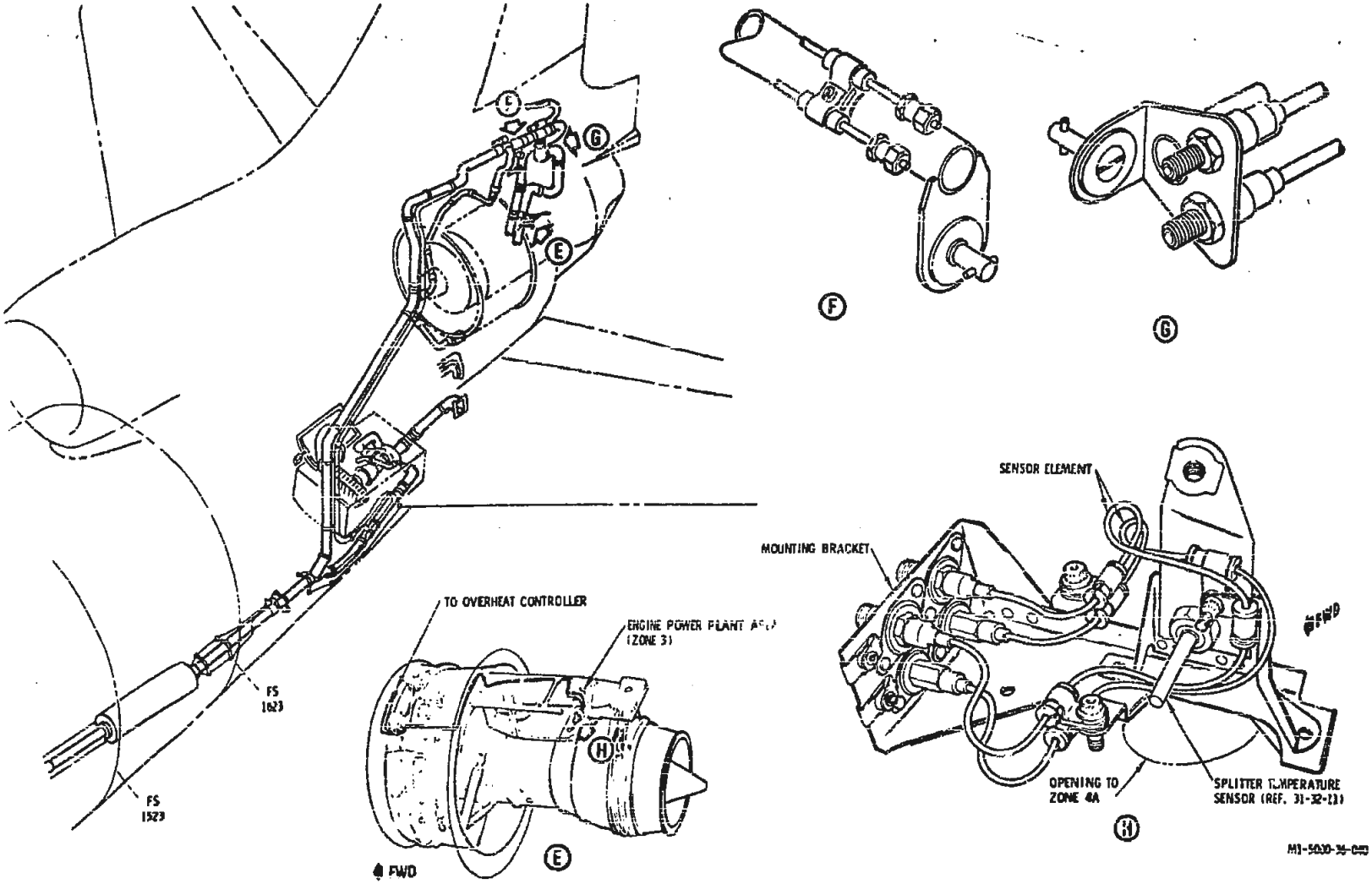


Bleed Air Area Overheat System Component Locations
Figure 2 (Sheet 4)

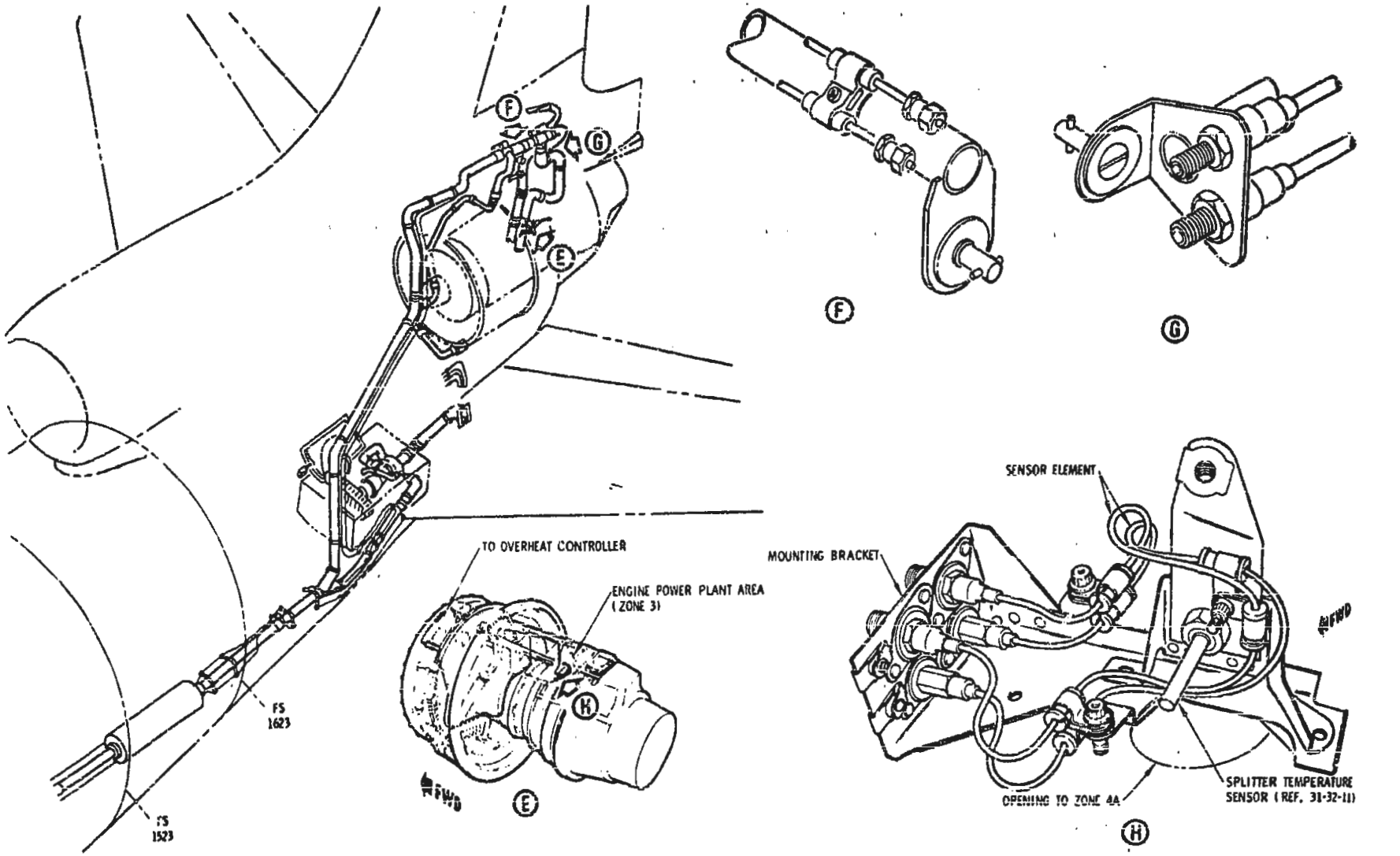


Bleed Air Overheat Area Sensor Locations
Figure 2 (Sheet 5)

R EFFECTIVITY: ALL
R
0018

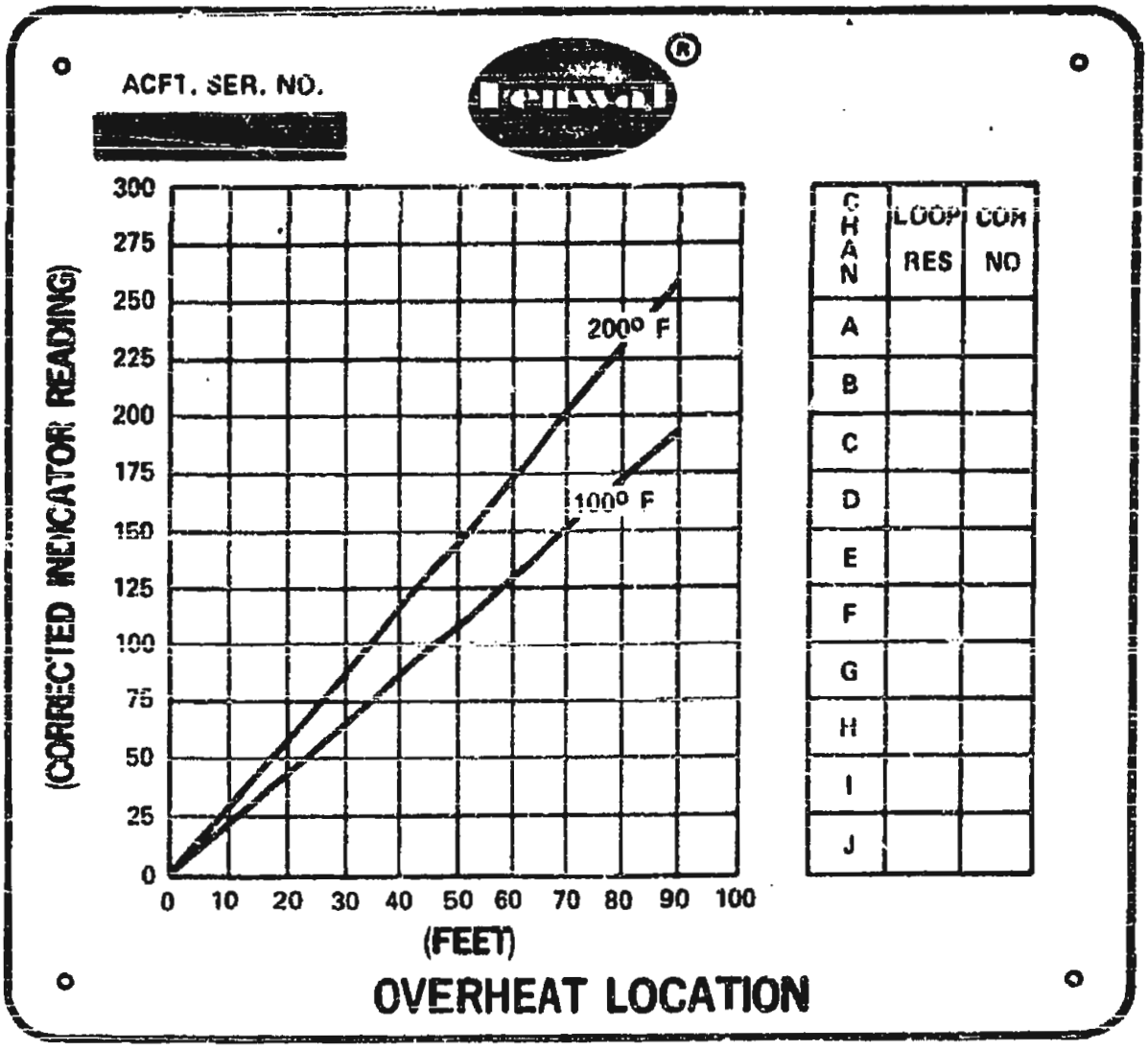


Bleed Air Area Overheat System Component Location
Figure 2 (Sheet 6)



Bleed Air Area Overheat System Component Location
Figure 2 (Sheet 6)

R
R
0018 EFFECTIVITY: RB211-22B ENGINES WITH SB72-3732



HOW TO USE NOMOGRAPH

(1) CORRECT THE INDICATOR COUNTER READING ON OVERHEAT CONTROLLER BY SUBTRACTING THE CORRECTION NUMBER OF FAULTED AREA CHANNEL

(2) ENTER LEFT SIDE OF CHART (CORRECTED INDICATOR READING) WITH CORRECTED COUNTER READING AND READ ACROSS TO INTERSECT THE 100°F OR 200°F LINE. USE 100°F LINE IF OVERHEAT OCCURRED INFLIGHT AND THE 200°F IF ON THE GROUND ON A HOT DAY

(3) FROM THE 100°F OR 200°F LINE (AS APPLICABLE) DROP DOWN VERTICALLY TO BASE LINE AND READ DISTANCE IN FEET. DISTANCE IS MEASURED FROM THE END OF SENSOR NEAREST TO CONTROLLER

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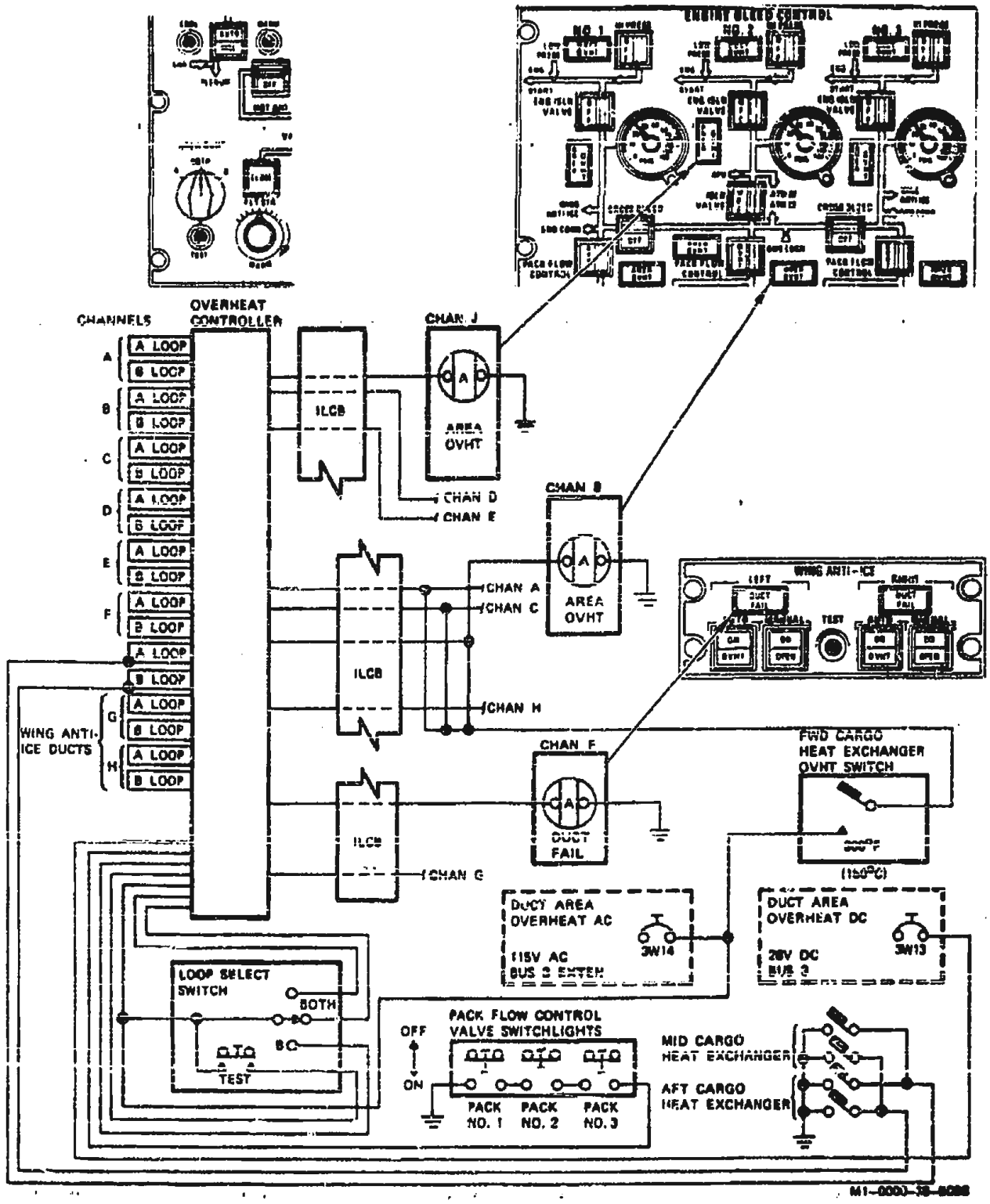
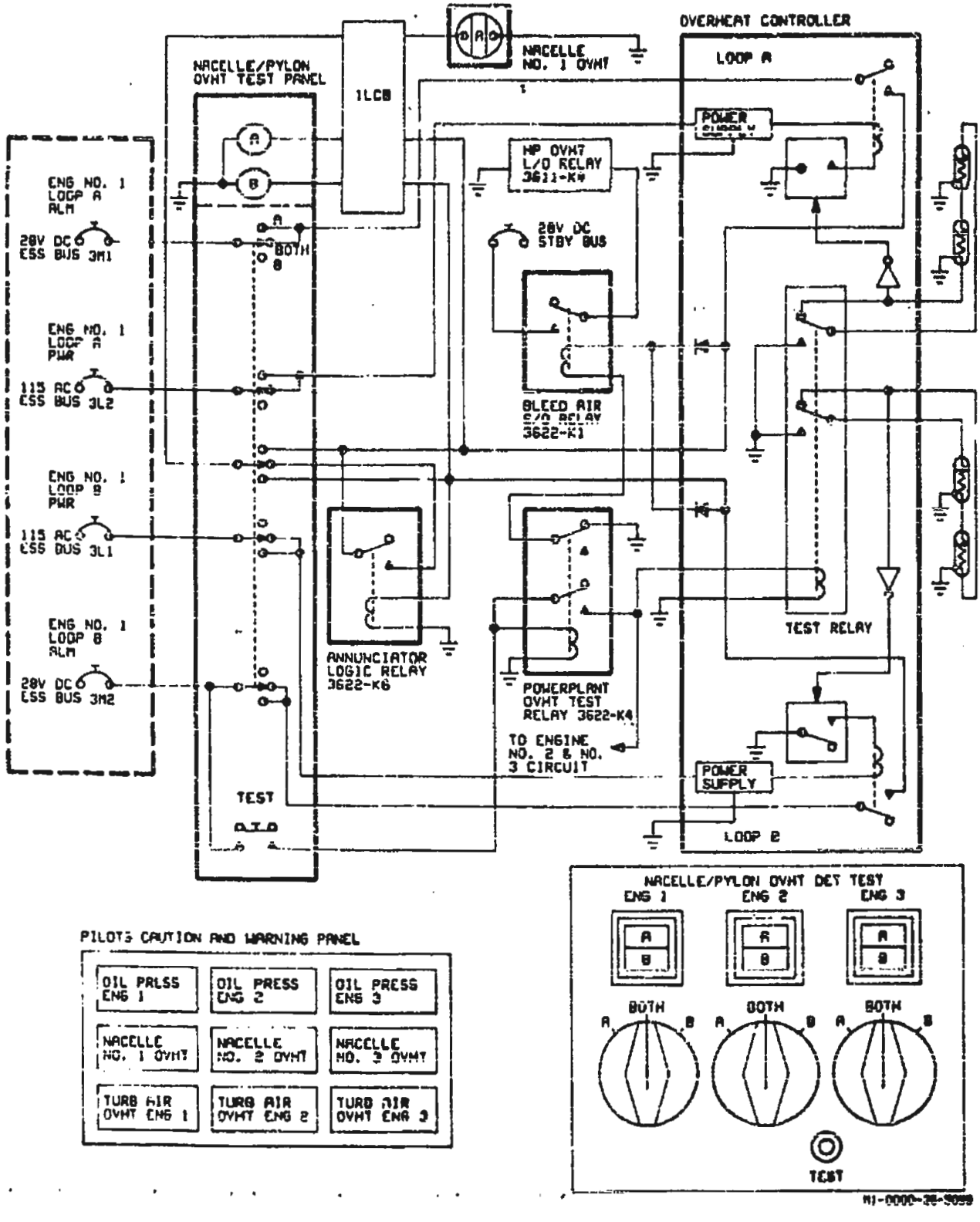
R
R

Bleed Air Overheat Fault Location Nomograph
Figure 3



Area Overheat System Simplified Schematic
Figure 4



Nacelle/Pylon Overheat System Simplified Schematic
Figure 5

BLEED AIR OVERHEAT WARNING SYSTEM - FAULT ISOLATION

1. General

R This section includes reference data and fault isolation
R procedures for troubleshooting Bleed Air Overheat Warning System
R faults. When system malfunction is detected by the flight crew,
R it is normally entered in the aircraft flight log book and
R reported to maintenance personnel using a FIRM fault code
R number. These numbers with flight log book write-ups are listed
R in the Chapter Fault Code Index. The index, usually gives the
R section, fault isolation diagram figure number and, where
R appropriate, the block number of the diagram entry point for
R beginning the fault isolation procedure. When no block number
R is specified, the diagram entry point is Block 1.

R When no fault isolation diagram is appropriate for a specific
R fault the index gives other references, such as test procedures
R or schematics, needed to determine a fault.

R PREREQUISITES at the top of each fault isolation diagram list
R necessary preliminary steps and the circuit breakers that must
R be closed before beginning any fault isolation step.

R Schematic diagrams supplement fault isolation procedures as
R troubleshooting aids. The schematics show basic circuitry of
R the system and include cross-reference indexes to the Wiring
R Diagram Manual pages needed to check wiring.

R Figure 101, Component Location Index, is an alphabetic listing
R of the components associated with the Bleed Air Overheat Warning
R System. It gives the area and access of each component and, if
R required, a removal and installation reference.

R Figure 102, Component Locator Diagram, shows the location of the
R components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for more
R information on the use of the Fault Isolation Reporting Method
R (FIRM) and fault isolation diagrams/schematics.

2. Resistance Check - Loop Resistance and Short to Ground

R CAUTION: USE ONLY A STANDARD AC RESISTANCE BRIDGE OR VTVM (RCA
R WV98B OR EQUIVALENT). NEVER USE THE RX1 OR RX10 SCALE
R WHEN MEASURING ACROSS THE LOOP TO GND AS THIS MAY
R IRREVERSIBLY POLARIZE THE MATERIAL BETWEEN THE INNER
R AND OUTER CONDUCTORS THEREBY DESTROYING THE LOOP.

ALLOW DUCTS ADJACENT TO SENSORS TO COOL BEFORE MEASURING RESISTANCE. DO NOT CHECK RESISTANCE OF LOOP TO GROUND IF AMBIENT TEMPERATURE AROUND SENSOR IS 210°F (100°C) OR GREATER, FOR NACELLE/PYLON SYSTEM IN ENGINE SPLITTER COMPARTMENT, OR 125°F (50°C) OR GREATER FOR ALL OTHER SYSTEMS.

LIMIT MEASUREMENTS TO 5 SECONDS REPEATED NO MORE THAN TWICE A MINUTE IF AMBIENT TEMPERATURE IS GREATER THAN NORMAL ROOM TEMPERATURE (70°F or 20°C). FAILURE TO APPLY THESE RULES COULD RESULT IN DAMAGE TO SENSORS.

NOTE: For completeness it is recommended that all loop resistances and resistances to ground be checked whenever any resistance check is made, to insure integrity on entire system.

A. On Flight Engineer/Second Officer Aft Circuit Breaker Panel, CB3, open circuit breakers for loops to be tested and tag:

CHANNEL	LOOP	CIRCUIT BREAKER
A thru J	A or B	DUCT AREA OVHT DET
		DC (W13)
		AC (W14)
Eng. No. 1 Nacelle/Pylon	A	NO. 1 ENG OVHT, LOOP A
		PWR (L2)
		ALARM (L1)
	B	NO. 1 ENG. OVHT LOOP B
		PWR (L4)
		ALARM (L3)
Eng. No. 2 Nacelle/Pylon	A	NO. 2 ENG OVHT, LOOP A

CHANNEL	LOOP	CIRCUIT BREAKER
		PWR (L8)
		ALARM (L7)
	B	NO. 2 ENG. OVHT, LOOP B
		PWR (L10)
		ALARM (L9)
Eng. No. 3 Nacelle/Pylon	A	NO. 3 ENG OVHT, LOOP A
		PWR (L14)
		ALARM (L13)
	B	NO. 3 ENG OVHT, LOOP B
		PWR (L16)
		ALARM (L15)

B. Locate Area Overheat Controller in MESC (Ref. Fig. 101 and 102).

C. Determine connector and pin numbers of loop being tested from Table 101.

Overheat Sensor Loops
TABLE 101

			PIN NUMBERS	
CHANNEL	LOOP	CONNECTOR	START	END
A	A	3622-P1 (J1)	4	14
	B	3622-P1 (J1)	7	16
B	A	3622-P1 (J1)	21	2
	B	3622-P1 (J1)	20	8
C	A	3622-P1 (J1)	13	3
	B	3622-P1 (J1)	17	6

Overheat Sensor Loops (Cont)
TABLE 101

CHANNEL	LOOP	CONNECTOR	PIN NUMBERS START	END
D	A	3622-P1 (J1)	28	27
	B	3622-P1 (J1)	34	33
E	A	3622-P1 (J1)	29	30
	B	3622-P1 (J1)	15	5
F	A	3622-P1 (J1)	22	41
	B	3622-P1 (J1)	40	39
G	A	3622-P1 (J1)	32	31
	B	3622-P1 (J1)	11	9
H	A	3622-P1 (J1)	23	24
	B	3622-P1 (J1)	37	38
J	A	3622-P1 (J1)	26	25
	B	3622-P1 (J1)	36	35
ENG 1 NACELLE/PYLON	A	3622-P51 (J3)	14	15
	B	3622-P51 (J3)	18	19
ENG 2 NACELLE/PYLON	A	3622-P52 (J4)	18	19
	B	3622-P52 (J4)	14	15
ENG 3 NACELLE/PYLON	A	3622-P53 (J5)	14	15
	B	3622-P53 (J5)	18	19

D. Pull connector from controller.

E. Check resistances from loop to ground.

(1) Measure resistance from start pin to ground.

(2) Measure resistance from end pin to ground.

(3) Both resistances should be at least 5 Megohms for area sensors and 1 Megohm for Nacelle/Pylon sensors.

(4) If resistances are very low check for short in lead-in wiring. If lead is shorted replace. Otherwise replace loop sensor (Ref. 36-22-02).

F. Check start-to end loop resistance:

(1) Measure resistance between start pin and end pin.

(2) Locate placard on forward MESC bulkhead, oppsite the overheat controller.

(3) For Channels A thru J read resistance given on table. Resistance should be within 10 percent of value given.

(4) For nacelle/pylon overheat loops, simply verify that loop resistance is low (less than 10 ohms).

(5) If loop is open circuited, wiring should be checked and repaired or loop should be replaced.

G. Reconnect connectors.

H. Close circuit breakers open in first step.

3. Locating Leaky Pneumatic Duct Using Overheat Controller

NOTE: Circuits are provided in the controller to locate overheats in channels F and G (wing anti-ice system), but since these loops are so short (less than 10 feet) they cannot accurately locate a fault. If a fault occurs in these channels do not use the following procedure, but inspect entire duct length for leaks.

No location circuits exist for Nacelle/Pylon Overheat system.

A. Determine the following from flight crew report:

(1) In what channel did overneat occur?

(2) How was loop selector switch set when fault occurred?

(3) Did any other overheat faults occur in channels A thru J since counter was last reset?

(4) Was selector switch moved within 16 seconds after fault occurred?

B. If the answers to (3) and (4) are both "No" then proceed. Otherwise the following procedure is invalid.

NOTE: If the log report is unclear as to what the answers to (3) and (4) are, proceed but be aware that if the following procedure does not locate a fault, it could be because (3) and (4) were affirmative.

C. Check loop resistance and test for shorts to ground (Ref. Para. 2).

D. If loop resistance is within 10 percent of the listed value, proceed to locate fault. If loop resistance is slightly over 10 percent out of tolerance, proceed to locate fault, but be aware that calculated location will be inaccurate.

E. If loop is shorted or open circuited, replace loop (Ref. MM 36-22-02). Do not continue this procedure. Instead, check entire channel length for leaks (Ref. Para. 4).

F. Read number on distance meter.

G. If selector switch was set to "A" or "B" divide the number by 2.

H. Determine correction number from table on placard located on forward MESC bulkhead, opposite the controller, and subtract it from the result of Step F or G.

I. Estimate the temperature of ambient air around sensor when fault was detected. Using the corresponding reference line (100°F or 200°F) of the nomograph or placard, determine distance in feet corresponding to corrected meter reading of Step H.

J. Reset controller by cutting lockwire and pressing both reset buttons until meter reads zero. Wirelock reset buttons.

K. Use Table 102 to locate area of overheat.

L. Remove access panels given in Table 102 and inspect ducts and components for leaks (Ref. Para. 4).

M. If Step L does not locate fault add and subtract 10 percent of loop length to result of Step I and using Table 102, inspect all areas between these two numbers.

CHANNEL	DISTANCE (FEET)	LOCATION	ACCESS
A	0-5	FS 915-963	GALLEY LIFT DRIP END PANEL, MESC – FLOOR PANELS 137HB, 137FB
A	5-10	FS 855-915	GALLEY – FLOOR PANEL 136CT, GALLEY LIFT DRIP END PANEL
A	10-15	FS 795-855	GALLEY – FLOOR PANEL 136CT
A	15-20	FS 735-795	GALLEY – FLOOR PANEL 136AT
A	20-25	FS 675-735	FORWARD CARGO – FLOOR PANEL 126QT, GALLEY – FLOOR PANEL 136AT
A	25-30	FS 625-675	FORWARD CARGO – FLOOR PANELS 124KT, 126NT
A	30-35	FS 575-625	FORWARD CARGO – FLOOR PANELS 124HT, 126KT
A	35-40	FS 517-575	FORWARD CARGO – FLOOR PANELS 124DT, 126FT
A	40-45	FS 468-517	FORWARD CARGO – FLOOR PANELS 126AT, 126DT
A	45-50	FS 420-468	LEFT ECS COMPARTMENT – FORWARD CARGO – FLOOR PANEL 124AT
A	50-55	FS 379-420	LEFT ECS COMPARTMENT
B	0-5	FS 900-963	GALLEY LIFT DRIP END PANELS, MESC – FLOOR PANELS 137CB, 137JB
B	5-10	FS 866-900	GALLEY – FLOOR PANEL 136DT
B	10-15	FS 806-866	GALLEY – FLOOR PANEL 136DT
B	15-20	FS 750-806	GALLEY – FLOOR PANEL 136BT
B	20-25	FS 690-750	FORWARD CARGO COMPARTMENT – FLOOR PANEL 124TT, GALLEY – FLOOR PANEL 136BT
B	25-30	FS 630-690	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124MT, 124PT
B	30-35	FS 570-630	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124JT, 124MT
B	35-40	FS 510-570	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124ET, 124GT
B	40-45	FS 450-510	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124BT, 124ET
B	45-50	FS 440-450	RIGHT ECS COMPARTMENT – PANEL 118CR
B	50-55	FS 410-440	RIGHT ECS COMPARTMENT – PANEL 118CR
B	55-60	FS 378-410	RIGHT ECS COMPARTMENT – PANEL 118CR
C	0-5	FS 920-963	RIGHT GALLEY LIFT DRIP END PANEL
C	5-10	FS 880-920	GALLEY – FLOOR PANEL 136DT, RIGHT GALLEY LIFT DRIP END PANEL
C	10-15	FS 820-880	GALLEY – FLOOR PANEL 136DT
C	15-20	FS 760-820	GALLEY – FLOOR PANELS 136BT, 136DT
C	20-25	FS 700-760	GALLEY – FLOOR PANEL 136BT
C	25-30	FS 640-700	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124MT, 124PT, 124TT
C	30-35	FS 590-640	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124JT, 124MT
C	35-40	FS 530-590	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124GT, 124JT
C	40-45	FS 470-530	FORWARD CARGO COMPARTMENT – FLOOR PANELS 124BT, 124ET
C	45-50	FS 440-470	RIGHT ECS COMPARTMENT – PANEL 118CR
C	50-55	FS 410-440	RIGHT ECS COMPARTMENT – PANEL 118CR
C	55-60	FS 378-410	RIGHT ECS COMPARTMENT – PANEL 118CR

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R Area Overheat Location and Access
R Table 102 (Sheet 1)

CHANNEL	DISTANCE (FEET)	LOCATION	ACCESS
A	0-6	FS 963-890	MESC - FLOOR PANELS 137HB, 137FB, GALLEY LIFT DRIP END PANELS
A	6-10	FS 890-830	GALLEY - FLOOR PANEL 136CT
A	10-15	FS 830-770	GALLEY - FLOOR PANELS 136AT, 136CT
A	15-20	FS 770-710	GALLEY - FLOOR PANEL 136AT
A	20-25	FS 710-640	FORWARD CARGO - FLOOR PANELS 124NT, 124QT
A	25-30	FS 640-589	FORWARD CARGO - FLOOR PANELS 124HT, 124KT
A	30-35	FS 589-529	FORWARD CARGO - FLOOR PANELS 124FT, 124HT
A	35-40	FS 529-468	FORWARD CARGO - FLOOR PANELS 124AT, 124DT
A	40-45	FS 468-420	LEFT ECS COMPARTMENT, FORWARD CARGO - FLOOR PANEL 124AT
A	45-50	FS 420-379	LEFT ECS COMPARTMENT
B	0-6	FS 963-880	GALLEY - FLOOR PANEL 136DT, LEFT AND RIGHT GALLEY LIFT DRIP END PANELS, MESC - FLOOR PANELS 137EB, 137JB
B	6-10	FS 880-820	GALLEY - FLOOR PANEL 136DT
B	10-15	FS 820-760	GALLEY - FLOOR PANELS 136BT, 136DT
B	15-20	FS 760-703	GALLEY - FLOOR PANEL 136BT
B	20-25	FS 703-609	FORWARD CARGO - FLOOR PANELS 124HT, 124PT, 124TT
B	25-30	FS 609-555	FORWARD CARGO - FLOOR PANELS 124GT, 124JT
B	30-35	FS 555-500	FORWARD CARGO - FLOOR PANELS 124ET, 124GT
B	35-40	FS 500-445	FORWARD CARGO - FLOOR PANEL 124BT
B	40-45	FS 445-400	RIGHT ECS COMPARTMENT - PANEL 118CR
B	45-50	FS 400-379	RIGHT ECS COMPARTMENT - PANEL 118CR
C	0-5	FS 943-920	RIGHT GALLEY LIFT DRIP END PANEL
C	5-10	FS 920-880	GALLEY - FLOOR PANEL 136DT, RIGHT GALLEY LIFT DRIP END PANEL
C	10-15	FS 880-840	GALLEY - FLOOR PANEL 136DT
C	15-20	FS 840-790	GALLEY - FLOOR PANELS 136BT, 136DT
C	20-25	FS 790-730	GALLEY - FLOOR PANEL 136BT
C	25-30	FS 730-680	FORWARD CARGO COMPARTMENT - FLOOR PANEL 124TT, GALLEY - FLOOR PANEL 136BT
C	30-35	FS 680-630	FORWARD CARGO COMPARTMENT - FLOOR PANELS 124MT, 124PT
C	35-40	FS 630-570	FORWARD CARGO COMPARTMENT - FLOOR PANELS 124JT, 124MT
C	40-45	FS 570-510	FORWARD CARGO COMPARTMENT - FLOOR PANELS 124ET, 124GT
C	45-50	FS 510-450	FORWARD CARGO COMPARTMENT - FLOOR PANELS 124BT, 124ET
C	50-55	FS 450-400	RIGHT ECS COMPARTMENT - PANEL 118CR
C	55-60	FS 400-379	RIGHT ECS COMPARTMENT - PANEL 118CR

CHANNEL	DISTANCE (FEET)	LOCATION	ACCESS
D	0-5	FS963-983, LBL20-90	MESC – FLOOR PANEL 137AB, CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142DB
D	5-10	FS983, LBL90-90	CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142DB, LEFT WING FAIRING – PANEL 193A
D	10-15	FS983, LBL90-116, LES55-67	LEFT WING FAIRING – PANEL 193A, WING LEADING EDGE – PANEL 511BB
D	15-20	LES67-125	WING LEADING EDGE – PANELS 511CB, 511DB
D	20-25	LES125-182	WING LEADING EDGE – PANELS 511EB, 511FB
D	25-30	LES182-240	WING LEADING EDGE – PANEL 511GB
D	30-35	LES240-295	WING LEADING EDGE – PANEL 511HB, 511TB
D	35-40	LES295-345	WING LEADING EDGE – PANELS 511KB, 511LB
D	40-43	LES345-365	WING LEADING EDGE – PANEL 511LB
E	0-5	FS963-983, RBL20-90	MESC – FLOOR PANEL 137DB, CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142DB
E	5-10	FS983, RBL90-90	CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142DB, RIGHT WING FAIRING – PANEL 194A
E	10-15	FS983, LBL90-116, LES55-67	RIGHT WING FAIRING – PANEL 194A, WING LEADING EDGE – PANEL 611BB
E	15-20	LES67-125	WING LEADING EDGE – PANELS 611CB, 611DB
E	20-25	LES125-182	WING LEADING EDGE – PANELS 611EB, 611FB
E	25-30	LES182-240	WING LEADING EDGE – PANEL 611GB
E	30-35	LES240-295	WING LEADING EDGE – PANELS 611HB, 611TB
E	35-40	LES295-345	WING LEADING EDGE – PANELS 611KB, 611LB
E	40-43	LES345-365	WING LEADING EDGE – PANEL 611LB
H	0-5	FS963-1005, LBL30	MESC – FLOOR PANEL 137BB, CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142DB
H	5-10	FS1005-1065, LBL30	CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142EB
H	10-15	FS1065-1120, LBL30	CRAWL SPACE UNDER WING CENTER SECTION – PANELS 142EB, 142GB
H	15-20	FS1120-1180, LBL30	CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142GB
H	20-25	FS1180-1230, LBL30	CRAWL SPACE UNDER WING CENTER SECTION – PANEL 142GB
H	25-30	FS1230-1290, LBL30	HYDRAULIC SERVICE CENTER
H	30-35	FS1290-1350, LBL30	HYDRAULIC SERVICE CENTER
H	35-40	FS1350-1360, LBL30-RBL20	HYDRAULIC SERVICE CENTER
H	40-45	FS1360, RBL20-60	HYDRAULIC SERVICE CENTER, RIGHT MLG WHEEL WELL
H	45-52	FS1360-1400, RBL60-00	CARGO COMPARTMENT – FLOOR PANELS 154BT, 154DT, AND RIGHT WING FAIRING PANEL 1960

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R Area Overheat Location and Access
R Table 102 (Sheet 2)

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CHANNEL	DISTANCE (FEET)	LOCATION	ACCESS
J	0-5	FS1343-1363, LBL32-83	HYDRAULIC SERVICE CENTER, LEFT MLG WHEEL WELL, LEFT WING FAIRING PANEL 1950
J	5-10	FS1363-1403, LBL83	LEFT WING FAIRING PANEL 1950
J	10-15	FS1395, WL110-140, LBL83	LEFT WING FAIRING PANEL
J	15-20	FS1395-1415, WL140-180, LBL83	CENTER CARGO COMPARTMENT, WALL PANELS 153CL, 153DL
J	20-25	FS1415-1550, WL180, LBL83	CENTER CARGO COMPARTMENT, WALL PANELS 153DL, 153FL
J	25-30	FS1550-1610, WL180, LBL83	CENTER CARGO COMPARTMENT, WALL PANEL 153HL
J	30-35	FS1610-1665, WL180, LBL83	AFT CARGO COMPARTMENT, WALL PANEL 163AL
J	35-40	FS1665-1765, WL180, LBL83	AFT CARGO COMPARTMENT, WALL PANELS 163AL, 163BL
J	40-45	FS1765-1830, WL180, LBL83	AFT CARGO COMPARTMENT, WALL PANELS 163CL, 161BL
J	45-50	FS1830-1890, WL180	EXTERIOR PANEL 316BB
J	50-55	FS1890-1920, WL180	EXTERIOR PANELS 316BB AND 317AB
J	55-60	FS1650, WL200-260	EXTERIOR PANEL 316BG (BEHIND AFT CABIN PRESSURE BULKHEAD)
J	60-65	FS1850-1910, WL265	AIRGATE FAIRING ATTACHMENT PANEL 337BT
J	65-70	FS1910-1970, WL265	LEFT AIRGATE FAIRING ATTACHMENT 337BT
J	70-75	FS1970, WL265-300	LEFT AIRGATE FAIRING ATTACHMENT 337BT
J	75-80	FS1970-1980, WL300-340	UPPER AFTERBODY EXTERIOR ACCESS PANEL 313FR
J	80-85	FS1980-2040, WL340	UPPER AFTERBODY EXTERIOR ACCESS PANEL 313FR
J	85-88	FS2040-2055, WL340	ENGINE ISOLATION VALVE ACCESS PANEL 471AL

CHANNEL	DISTANCE (FEET)	LOCATION	ACCESS
J	0-5	FS1369-1390, WL116, LBL10-48	HYDRAULIC SERVICE CENTER AND LEFT MLG WHEEL WELL
J	5-10	FS1390-1410, WL120, LBL48-80	LEFT MLG WHEEL WELL AND LEFT WING FAIRING PANEL 1950
J	10-15	FS1390-1410, WL120-180, LBL80-90	LEFT WING FAIRING PANEL 1959
J	15-20	FS1390-1430, WL180, LBL90	CENTER CARGO COMPARTMENT - WALL PANELS 153CL, 153DL
J	20-25	FS1430-1485, WL180, LBL90	CENTER CARGO COMPARTMENT - WALL PANELS 153DL, 153FL
J	25-30	FS1485-1555, WL180, LBL90	CENTER CARGO COMPARTMENT - WALL PANELS 153FL, 153HL
J	30-35	FS1555-1610, WL180, LBL90	CENTER CARGO COMPARTMENT - WALL PANEL 153HL
J	35-40	FS1610-1665, WL180, LBL90	AFT CARGO COMPARTMENT - WALL PANEL 163AL
J	40-45	FS1665-1720, WL180, LBL90	AFT CARGO COMPARTMENT - WALL PANELS 163AL, 163BL
J	45-50	FS1720-1775, WL180, LBL90	AFT CARGO COMPARTMENT - WALL PANELS 163BL, 163CL
J	50-55	FS1775-1825, WL180, LBL90	AFT CARGO COMPARTMENT - WALL PANELS 163CL, 161BL
J	55-60	FS1825-1850, WL150-180, LBL90	EXTERIOR PANEL 316BB
J	60-65	FS1850-1917, WL150-175, LBL90	EXTERIOR PANEL 317AB
J	65-70	FS1860, WL175-240	EXTERIOR PANEL 316BB (BEHIND AFT CABIN PRESSURE BULKHEAD)
J	70-75	FS1860-1875, WL240-265	EXTERIOR ACCESS PANEL 316BB, AIRGATE FAIRING ATTACHMENT 397BT
J	75-80	FS1875-1935, WL265	AIRGATE FAIRING ATTACHMENT 397BT
J	80-85	FS1935-1955, WL265-290	AIRGATE FAIRING ATTACHMENT 397BT
J	85-90	FS1955-1965, WL290-350	UPPER AFTERBODY EXTERIOR ACCESS PANEL 313FR
J	90-95	FS1965-2050, WL350	UPPER AFTERBODY EXTERIOR ACCESS PANEL 313FR
J	95-100	FS2050-2046, WL350	UPPER AFTERBODY EXTERIOR ACCESS PANEL 313FR, ENGINE ISOLATION VALVE ACCESS PANEL 471AL

4. Inspecting Ducts for Leaks

NOTE: If fault occurs in channels A thru E, H or J use overheat controller location meter to determine approximate location of fault (Ref. Para. 3).

C NOTE: When troubleshooting "D" or "E" or "H" area overheats, the likely cause is a leak in the pack valve area; and when troubleshooting "F" or "G" area overheats, the likely cause is a leak in the engine isolation valve area.

A. Turn off or disconnect all pneumatic supply.

B. Gain access to area of suspected fault.

CAUTION: HOT AIR LEAKING FROM DUCTS CAN CAUSE SEVERE BURNS. WEAR GLOVES AND EYE PROTECTION IN ALL FURTHER STEPS.

C. C Connect and turn on high pressure ground air (Ref. MM 36-13-00) or APU air (NORM MODE).

D. Open any valves necessary (Pack Flow Control Valve, Aft Isolation Valve, Crossbleed Valves) to provide airflow to suspected duct.

E. Taking proper safety precautions inspect area for leaking ducts, flanges and components.

C F. Shut down air supply in use.

R G. Make repairs necessary to fix leak.

H. After completing repair check by repeating Steps C thru F.

I. Replace access panels.

C 4B. Pneumatic Air Duct Leak Check - Engine Splitter Area (Zone 3)

C 1. General

C Duct leak check is identical for all 3 engine positions C except for circuit breaker location and access panel C references.

C WARNING: THIS PROCEDURE MUST BE FOLLOWED CAREFULLY BY C QUALIFIED MAINTENANCE PERSONNEL WHO ARE THOROUGHLY C FAMILIAR WITH THRUST REVERSER OPERATION IN ORDER C TO PREVENT INJURY TO PERSONNEL AND/OR DAMAGE TO C EQUIPMENT.

C 2. Equipment and Materials

C Lock Bar (2 each) - Mfr P/N LJ23989 (TWA Stk Nbr 61-3078)

C Key - Deactivation - Mfr P/N LK59616 (TWA Stk Nbr 61-3152)

C Work Platform - Splitter Area Access

C Protective Goggles and Gloves

C 3. Referenced Procedures

C Thrust Reverser - Maintenance Practices 78-30-01

C 4. Leak Check

C NOTES:

C A. This procedure should be followed after any of the following has occurred in the splitter area.

C (1) Pneumatic system component replacement.

C (2) Suspected air leak due to pylon/nacelle overheat indication (known electrical fault does not require leak check).

C B. Minimum of 3 qualified maintenance personnel are needed to perform this procedure.

C (1) One person in the flight station to monitor flight station controls.

C (2) One person to perform the leak check.

C (3) One person on the ground at the vacinity of the engine being checked to coordinate procedure.

C A. Deactivate Thrust Reverser (Reference 78-30-01)

C (1) Deactivate thrust reverser in the forward thrust position per Figure 1.

C (2) Tag throttle levers and reverser levers.

C (3) Open and tag appropriate thrust reverse circuit breaker (H16, H17, or H18) on pilot's overhead circuit breaker panel CB1, zone 210.

C (4) Open and tag appropriate start air valve circuit breaker (N3, N9, or N15) on flight engineer's aft circuit breaker panel CB3, zone 215.

C (5) Tag appropriate engine start panel switch light.

C (6) Select open appropriate engine isolation valve
C switchlight.

C (7) Select open appropriate engine high pressure valve
C switchlight.

C (8) Pressurize appropriate engine pneumatic manifold
C (APU air or external ground air).

C (a) Select and hold appropriate APU/GND air
C reverser switch (at base of pilot's center
C console).

C (1) Appropriate isolation valve flow bar
C should illuminate.

C (2) Appropriate HP valve flow bar should
C illuminate.

C (3) Appropriate thrust reverser
C operating/reverser lights must be
C extinguished.

C (4) Reverser sleeve must remain stowed.

C (b) Release APU/GND air reverser switch and
C depressurize pneumatic system.

C B. Splitter Access

C (1) Install splitter area access work platform in
C engine cold stream collector nozzle (see figure
C 2).

C (2) Remove splitter access panels 418AL, 418AR, 418BL,
C 418BR, for engine number 1 or 428AL, 428AR, 428BL,
C 428BR for engine number 2 or 438AL, 438AR, 438BL,
C 438BR for engine number 3 (reference 6-40-00) (See
C figure 2).

C WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM
C WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY
C HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES
C SHOULD BE USED WHEN REQUIRED.

C (3) Exit splitter area and perform step 4.A(8) again.

C NOTE: Hold APU/GND air reverser switch for
C remainder of leak check.

C (4) Enter the cold stream area and leak check splitter
C area as required.

C WARNING: HOT AIR LEAKING FROM DUCTS OR COMPONENTS CAN
C CAUSE SEVERE BURNS. WEAR GLOVES AND EYE
C PROTECTION.

C (5) Release APU/GND air reverser switch.

C (6) Depressurize engine pneumatic manifold.

C (7) Correct air leak as required.

C (8) Perform air leak check to ensure no leak.

C (9) Install splitter access panels.

C (10) Remove splitter area access work platform.

C (11) Remove thrust reverser locking devices installed
C in step 4.A(1).

C (12) Remove all tags and close the circuit breaker
C opened in step 4.A(3) and 4.A(4).

5. Fault Isolation Data

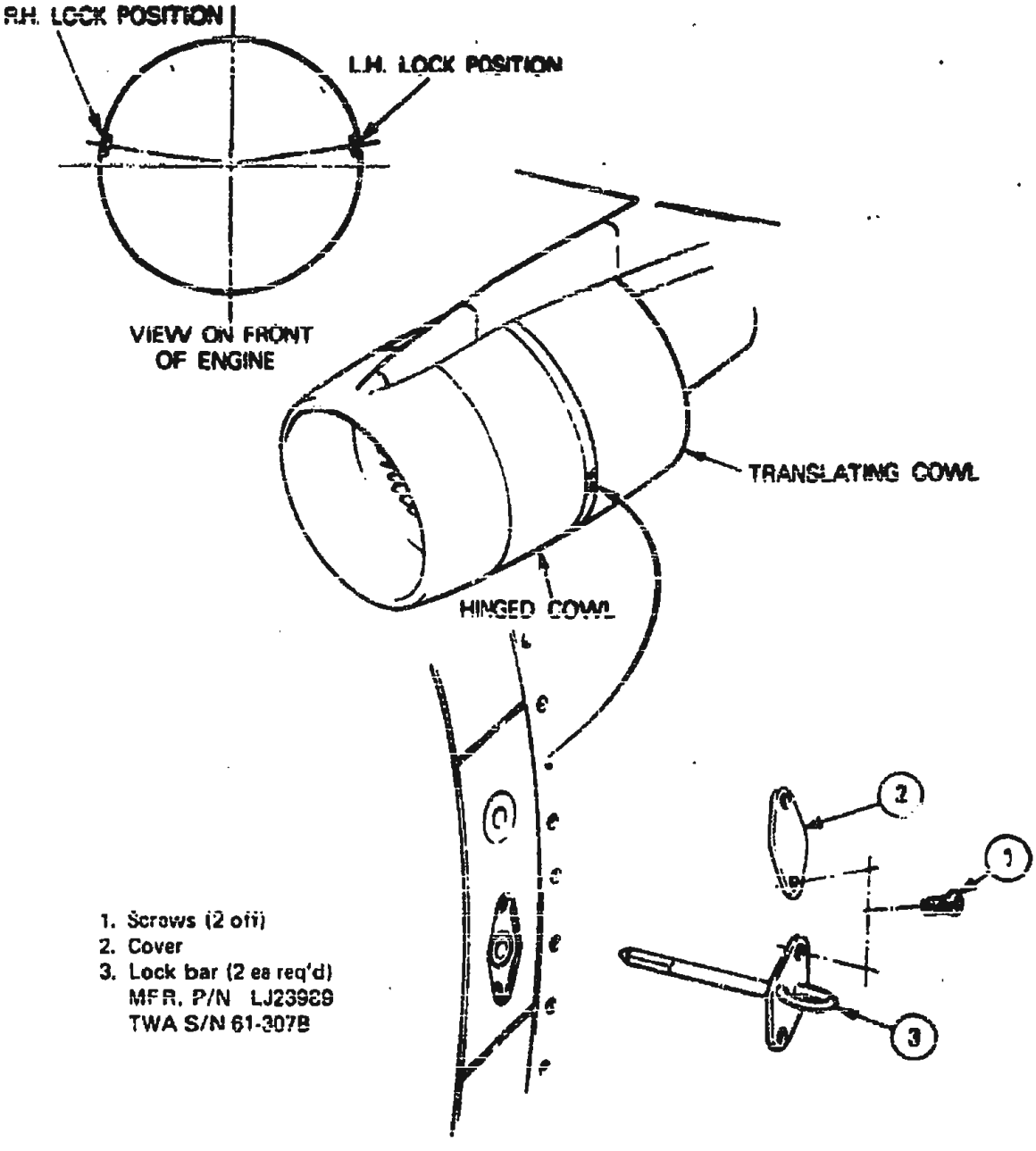
Table 103 lists the fault isolation data in this section.

Bleed Air Overheat Warning System Fault Isolation Data
TABLE 103

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Channel A, B, and/or C AREA OVHT Light On, Pilots AREA/DUCT OVERHEAT Light On
104	Channel D, E, or H AREA OVHT or LEFT or RIGHT Wing Anti-ice DUCT FAIL Legend On, Pilots AREA/DUCT OVERHEAT
R	Legend On
104	Channel D, E, or H AREA OVHT Legend On, Pilots AREA/DUCT OVERHEAT Legend On
105	Channel J AREA OVHT Light On, Pilots AREA/DUCT OVERHEAT Light On

Bleed Air Overheat Warning System Fault Isolation Data (Cont)
TABLE 103

FIGURE	TITLE
106	Area Overheat Test Checkout
107	Any one of AREA OVHT Channels A, B, C, D, E, H and J or LEFT or RIGHT DUCT FAIL Light On, Pilot's AREA/DUCT OVERHEAT Light Off
108	NACELLE/PYLON OVHT Light Problem
109	NACELLE/PYLON OVHT Test Problem
110	Any one of HI PRESS Valve Did Not Close With NACELLE/PYLON OVHT Light On and Pilots NACELLE (1, 2, 3) OVHT On
111	LEFT or RIGHT Wing Anti-Ice DUCT FAIL Legend On, Pilots AREA/DUCT OVERHEAT Legend On
SCHEM 1	Fuselage and Wing Area Overheat Systems Schematic
SCHEM 2	Engine No. 1 Nacelle/Pylon Area Overheat System Schematic
SCHEM 3	Engine No. 2 Nacelle/Pylon Area Overheat System Schematic
SCHEM 4	Engine No. 3 Nacelle/Pylon Area Overheat System Schematic

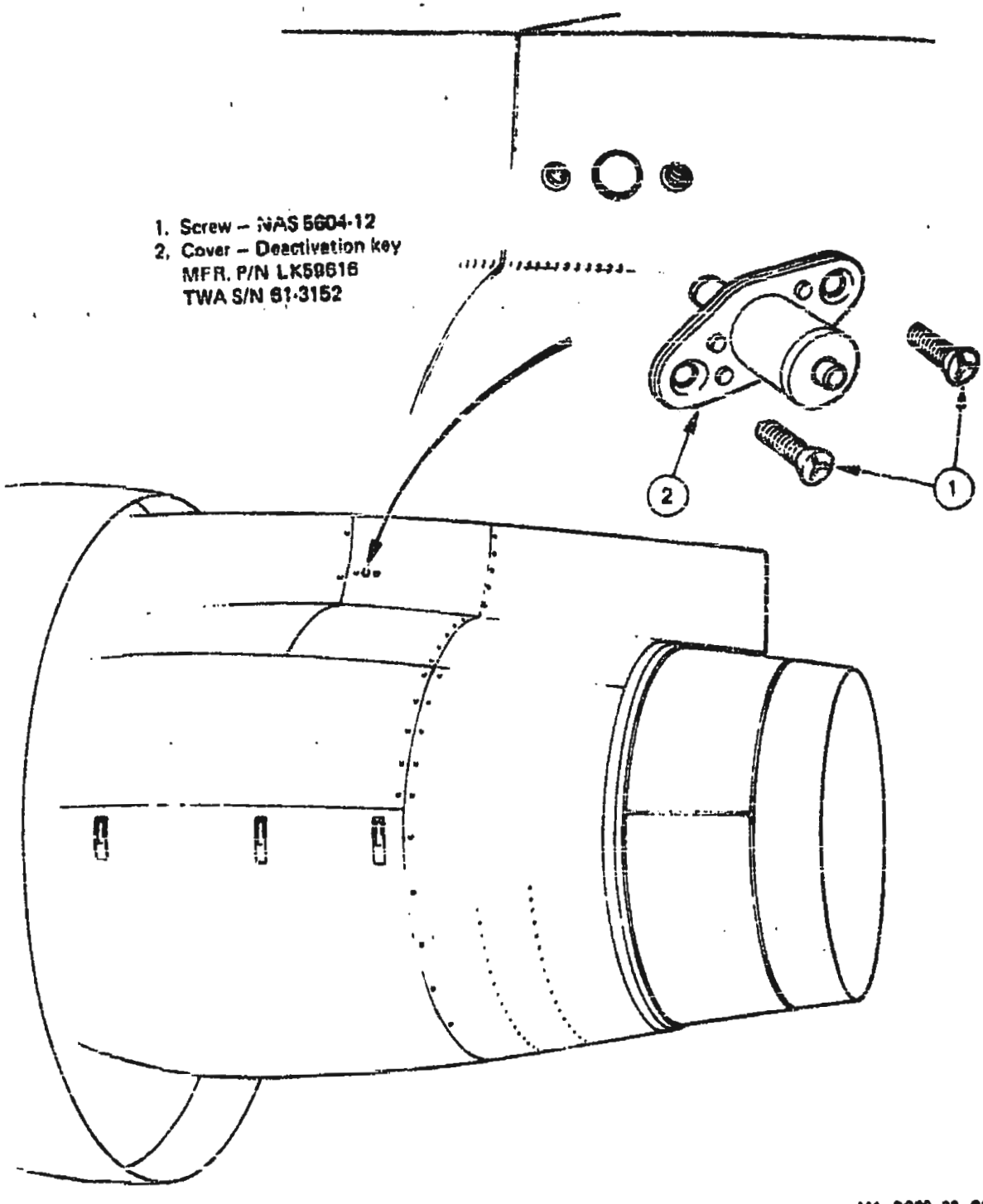


Wing engine shown, fuselage engine lock positions are located between mid fixed panels and translating cowl.

M1-0000-36-634

CR Thrust Reverser Lockout - Step 1 of 2
CR Install Gearbox Locking Keys (2 ea)
CR Figure 1 (Sheet 1)

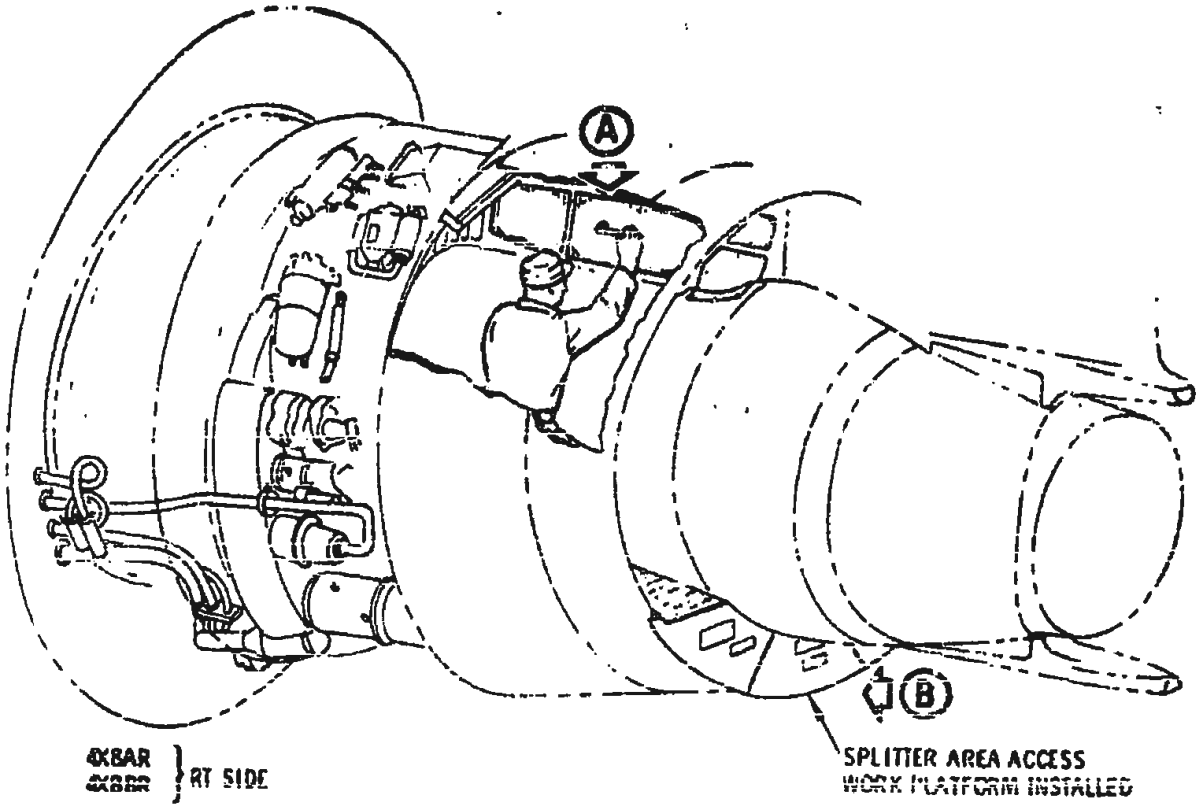
R EFFECTIVITY: ALL
R
001B

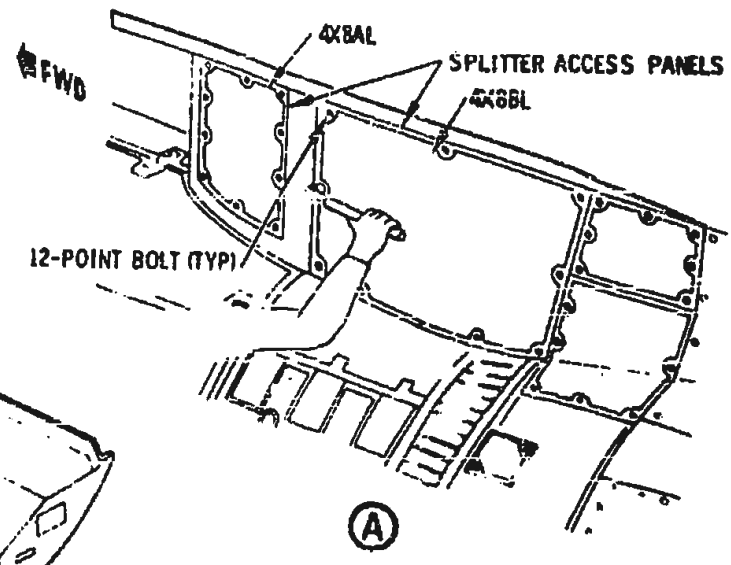


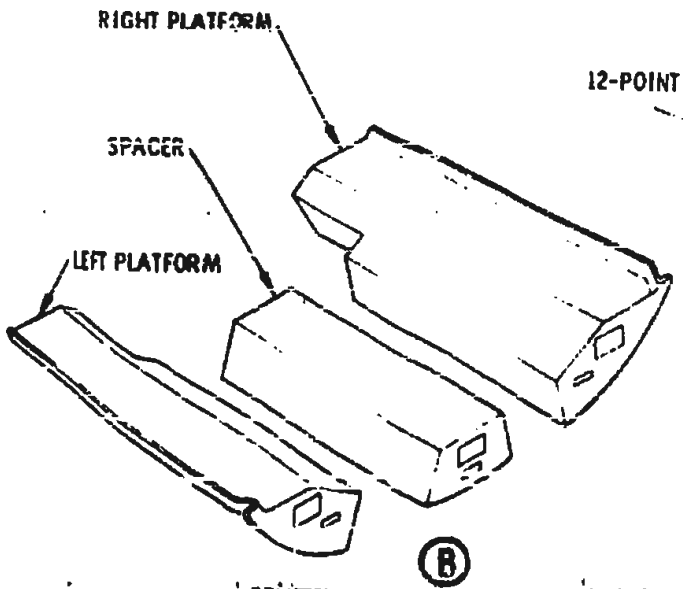
M1-0000-38-835

CR Thrust Reverser Lockout - Step 2 of 2
CR Install PRSOV Locking Key
CR Figure 1 (Sheet 2)

R EFFECTIVITY: ALL
R
0018







SPLITTER AREA ACCESS WORK PLATFORM

M1-0000-36-436

CR
CR
Splitter Area Access Work Platform - Removal and Installation
Figure 2

EFFECTIVITY: ALL

001B

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
DUCT AREA OVHT – DET – AC	1	FLT STA/CB3 W14	*
DUCT AREA OVHT – DET – DC	1	FLT STA/CB3 W13	*
PILOTS IND LT TEST 2	1	FLT STA/CB2 H9	*
CONTROLLER, BLEED AIR AREA OVERHEAT	1	MESC/192K, 137AZ	36-22-01
DIODES	6	FESC/	*
DIODES	6	MESC/192K, 137AZ	*
INDICATOR LIGHTS CONTROL BOX			
CARD 1A9 (CHANNEL G)	1	MESC/192K, 137AZ	33-17-04
CARD 1A12 (CHANNEL F)	1	MESC/192K, 137AZ	33-17-04
CARD 1A13 (CHANNELS C, E)	1	MESC/192K, 137AZ	33-17-04
CARD 1A15 (CHANNELS A, D)	1	MESC/192K, 137AZ	33-17-04
CARD 1A20 (AREA/DUCT OVERHEAT)	1	MESC/192K, 137AZ	33-17-04
CARD 1A28 (CHANNELS B, H, J)	1	MESC/192K, 137AZ	33-17-04
INDICATOR LIGHTS (ENGINE BLEED CONTROL)	7	FLT STA/FESO INSTR PANEL	20-33-04
INDICATOR LIGHTS (WING ANTI-ICE PNL)	2	FLT STA/PILOTS OVERHEAD PANEL	20-33-04
INDICATOR LIGHT (PILOTS CAUTION AND WARNING PANEL)	1	FLT STA/PILOTS CENTER INSTRUMENT PANEL	20-33-04
PANEL, CONTROL, ENGINE BLEED	1	FLT STA/FESO INSTR PANEL	36-00-01
SENSORS, AREA OVERHEAT, CHANNELS A,B,C. (LOOPS A,B)	6	FWD FUS (SEE 36-22-02, TABLE 401)	36-22-02
SENSORS AREA OVERHEAT, CHANNELS D, E (LOOPS A, B)	4	WING LEADING EDGE (SEE 36-22-02, TABLE 401)	36-22-02
SENSORS, AREA OVERHEAT (DUCT FAIL), CHANNELS F, G (LOOPS A, B)	4	WING LEADING EDGE, ANTI-ICE (SEE 36-22-02, TABLE 401)	36-22-02
SENSORS, AREA OVERHEAT, CHANNEL H (LOOPS A, B)	2	KEELSON AND HYD SERVICE CTR (SEE 36-22-02, TABLE 401)	36-22-02
SENSORS, AREA OVERHEAT, CHANNEL J (LOOPS A, B)	2	AFT FUS TO NO. 2 ENG ISLN VALVE (SEE 36-22-02, TABLE 401)	36-22-02
SWITCH, THERMAL, FWD HEAT EXCHANGER	1	BELOW FWD CARGO COMPT FLOOR/124 LT-1	36-22-20
SWITCH, THERMAL, CTR HEAT EXCHANGER	2	CTR CARGO COMPT LEFT SIDE/ 153FL-1	36-22-21
SWITCH, THERMAL, AFT HEAT EXCHANGER	2	AFT CARGO COMPT LEFT SIDE/ 163AL	36-22-22

*SEE WM EQUIPMENT LIST

M1-0000-36-366

Component Location Index
Figure 101 (Sheet 1)

R EFFECTIVITY: ALL
R
0016

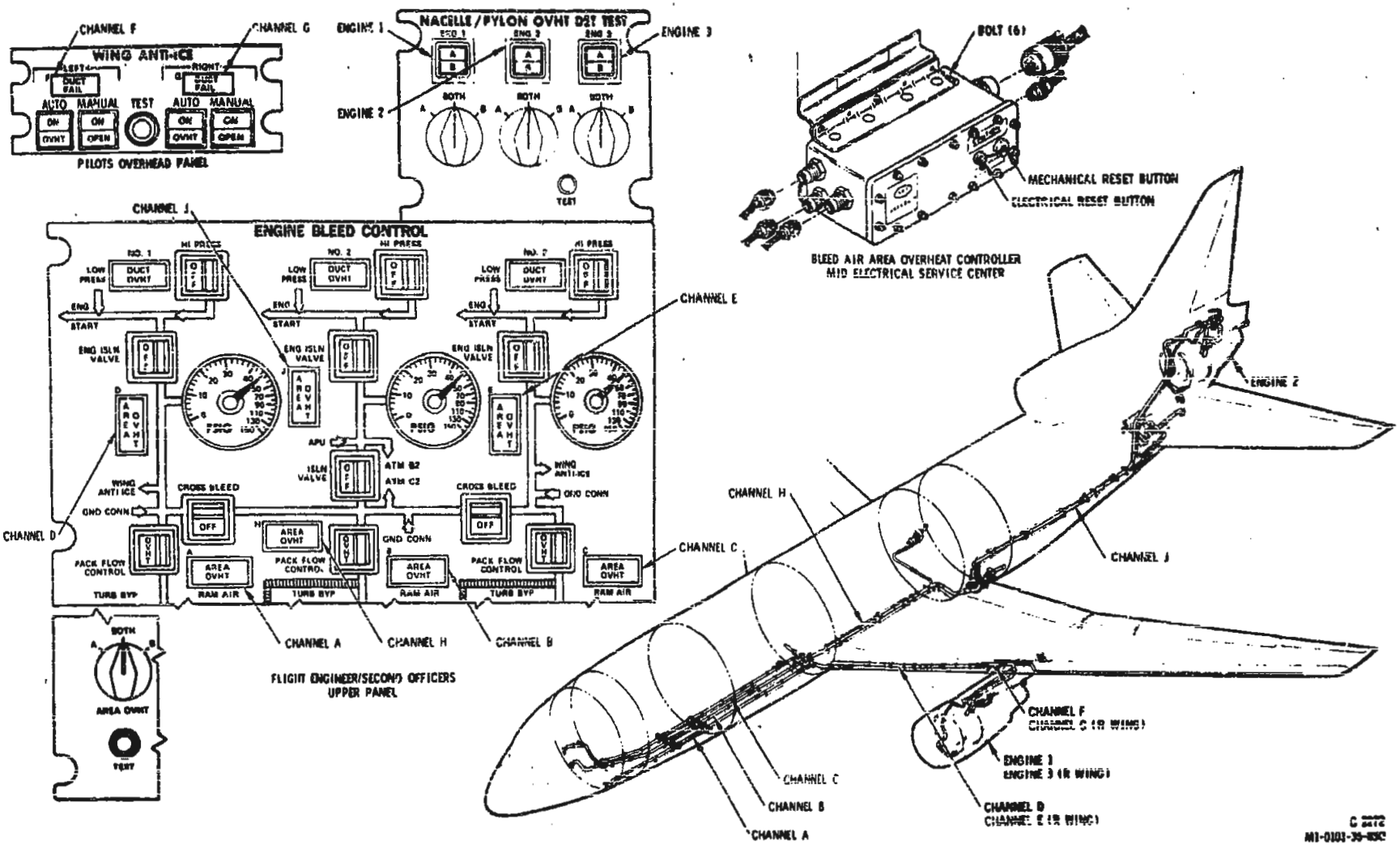
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS			
NO. 1, 2, 3 ENG OVHT – LOOP A – ALARM	3	FLT STA/CB3 L1, L7, L13	*
– PWR	3	FLT STA/CB3 L2, L8, L14	*
– LOOP B – ALARM	3	FLT STA/CB3 L3, L9, L15	*
– PWR	3	FLT STA/CB3 L4, L10, L16	*
PILOTS IND LT TEST 2	1	FLT STA/CB2 H9	*
CONTROLLER, BLEED AIR AREA OVERHEAT	1	MESC/192K, 137AZ	33–17–04
INDICATOR LIGHTS	3	FLT STA/FESO INSTR PNL	20–33–04
INDICATOR LIGHT (PILOTS CAUTION AND WARNING PANEL)	1	FLT STA/PILOTS CENTER INSTRUMENT PANEL	20–33–04
INDICATOR LIGHTS CONTROL BOX			
ENG 1 CARDS 1A5, 1A13, 1A20	3	MESC/192K, 137AZ	33–17–04
ENG 2 CARDS 1A26, 1A13, 1A1	3	MESC/192K, 137AB	33–17–04
ENG 3 CARDS 1A6, 1A17, 1A3	3	MESC/192K, 137AB	33–17–04
PANEL, CONTROL, NACELLE/PYLON OVHT DET TEST	1	FLT STA/FESO UPPER INSTRUMENT PANEL	36–22–89
RELAYS			
ANNUN LOGIC (3622-K6, -K7, -K8)	3	FESC/112AB, 211CB	*
BLEED AIR SHUTOFF (3622-K1, -K2, -K3)	3	MESC/192K, 137AB	*
TEST (3622-K4)	1	MESC/192K, 137AB	*
SENSORS			
ENG NO. 1	2	PYLON/453DR	36–22–16
ENG NO. 2	2	CENTER ENG SUP STRUCTURE/ 471AL, 471DL	36–22–17
ENG NO. 3	2	PYLON/463DL	36–22–18
ZONE 3	2	ENGINE/	
		NO. 1 418CL/418CR	36–22–23
		NO. 2 438CL/438CR	36–22–23
		NO. 3 428CL/428CR	36–22–23

*SEE WM EQUIPMENT LIST

M1–0000–38–402

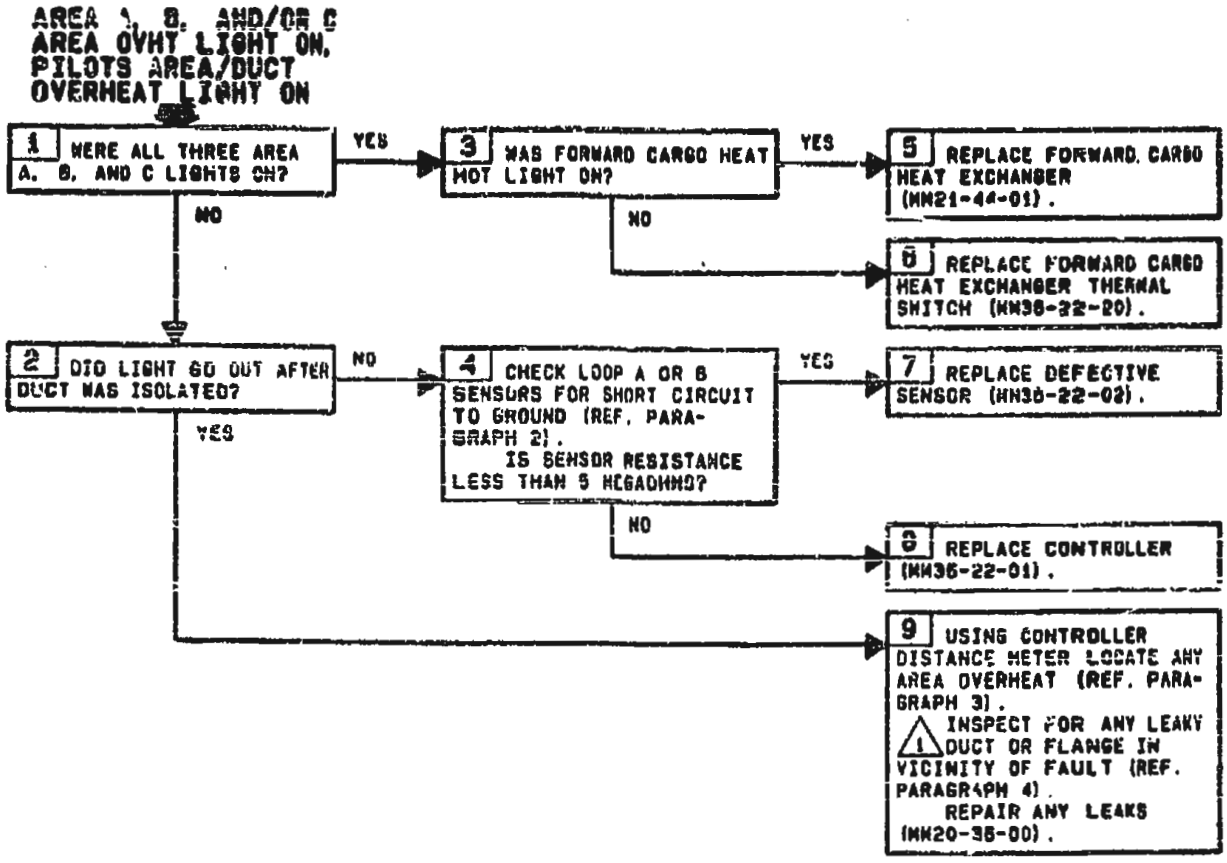
Component Locator Index
Figure 101 (Sheet 2)

R EFFECTIVITY: ALL
R
001B



Component Locator Diagram
Figure 102

PREREQUISITES
ELECTRICAL POWER (MM24-00-01)
PNEUMATIC POWER (MM36-00-00)
CB'S: 2M9, 3W13, 14


AREA A, B, AND/OR C AREA OVHT LIGHT ON, PILOTS AREA/DUCT OVERHEAT LIGHT ON
1 WERE ALL THREE AREA A, B, AND C LIGHTS ON?
YES
NO
2 DID LIGHT GO OUT AFTER DUCT WAS ISOLATED?
NO
YES
3 WAS FORWARD CARGO HEAT HOT LIGHT ON?
YES
NO
4 CHECK LOOP A OR B SENSORS FOR SHORT CIRCUIT TO GROUND (REF. PARAGRAPH 2). IS SENSOR RESISTANCE LESS THAN 5 MEGAOHMS?
YES
NO
5 REPLACE FORWARD CARGO HEAT EXCHANGER (MM21-44-01).
6 REPLACE FORWARD CARGO HEAT EXCHANGER THERMAL SWITCH (MM36-22-20).
7 REPLACE DEFECTIVE SENSOR (MM36-22-02).
8 REPLACE CONTROLLER (MM36-22-01).
9 USING CONTROLLER DISTANCE METER LOCATE ANY AREA OVERHEAT (REF. PARAGRAPH 3).
1 INSPECT FOR ANY LEAKY DUCT OR FLANGE IN VICINITY OF FAULT (REF. PARAGRAPH 4).
REPAIR ANY LEAKS (MM20-36-00).

NOTE

1 IF CONTROLLER DISTANCE METER INDICATES 9 TO 13 FEET ON AREA A OR 4 TO 8 ON AREA B OR C, INSPECT AIR CLEANER AND ASSOCIATED PURGE LINES FOR LEAKS.

M1-0005-36-5021

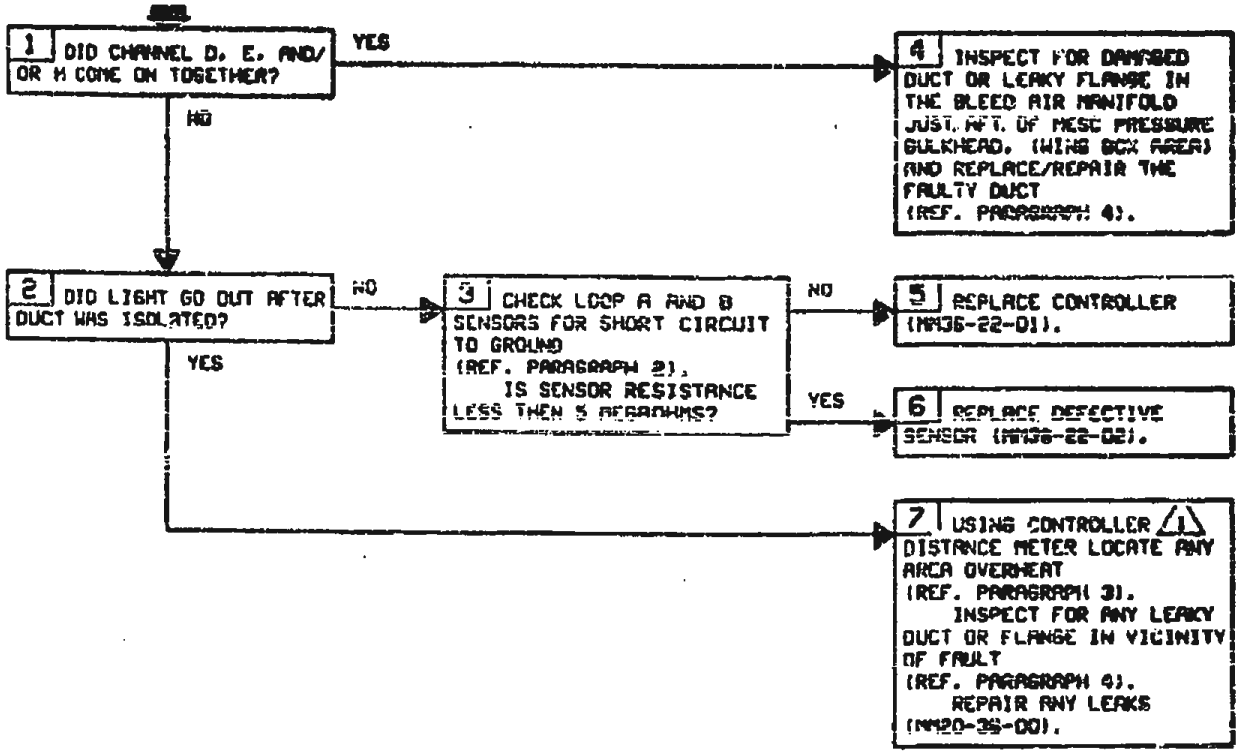
R Area A, B, and/or C AREA OVHT Light On, Pilots AREA/DUCT OVERHEAT
R Light On
R Figure 103

EFFECTIVITY: ALL

001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: EHSI 3419, 14

CH D, E OR H AREA OVHT
OR LEFT OR RIGHT WING
ANTI-ICE DUCT FAIL LIGHT
ON AND PILOTS AREA/DUCT
OVERHEAT LIGHT ON


1 DID CHANNEL D, E, AND/OR H COME ON TOGETHER?
YES
NO
4 INSPECT FOR DAMAGED DUCT OR LEAKY FLANGE IN THE BLEED AIR MANIFOLD JUST AFT OF MISC PRESSURE BULKHEAD. (WING BOX AREA) AND REPLACE/REPAIR THE FAULTY DUCT (REF. PARAGRAPH 4).
2 DID LIGHT GO OUT AFTER DUCT WAS ISOLATED?
NO
3 CHECK LOOP A AND B SENSORS FOR SHORT CIRCUIT TO GROUND (REF. PARAGRAPH 2). IS SENSOR RESISTANCE LESS THEN 5 MEGAOHMS?
NO
5 REPLACE CONTROLLER (MM36-22-01).
YES
6 REPLACE DEFECTIVE SENSOR (MM36-22-02).
YES
7 USING CONTROLLER /1\ DISTANCE METER LOCATE ANY AREA OVERHEAT (REF. PARAGRAPH 3). INSPECT FOR ANY LEAKY DUCT OR FLANGE IN VICINITY OF FAULT (REF. PARAGRAPH 4). REPAIR ANY LEAKS (MM20-36-00).

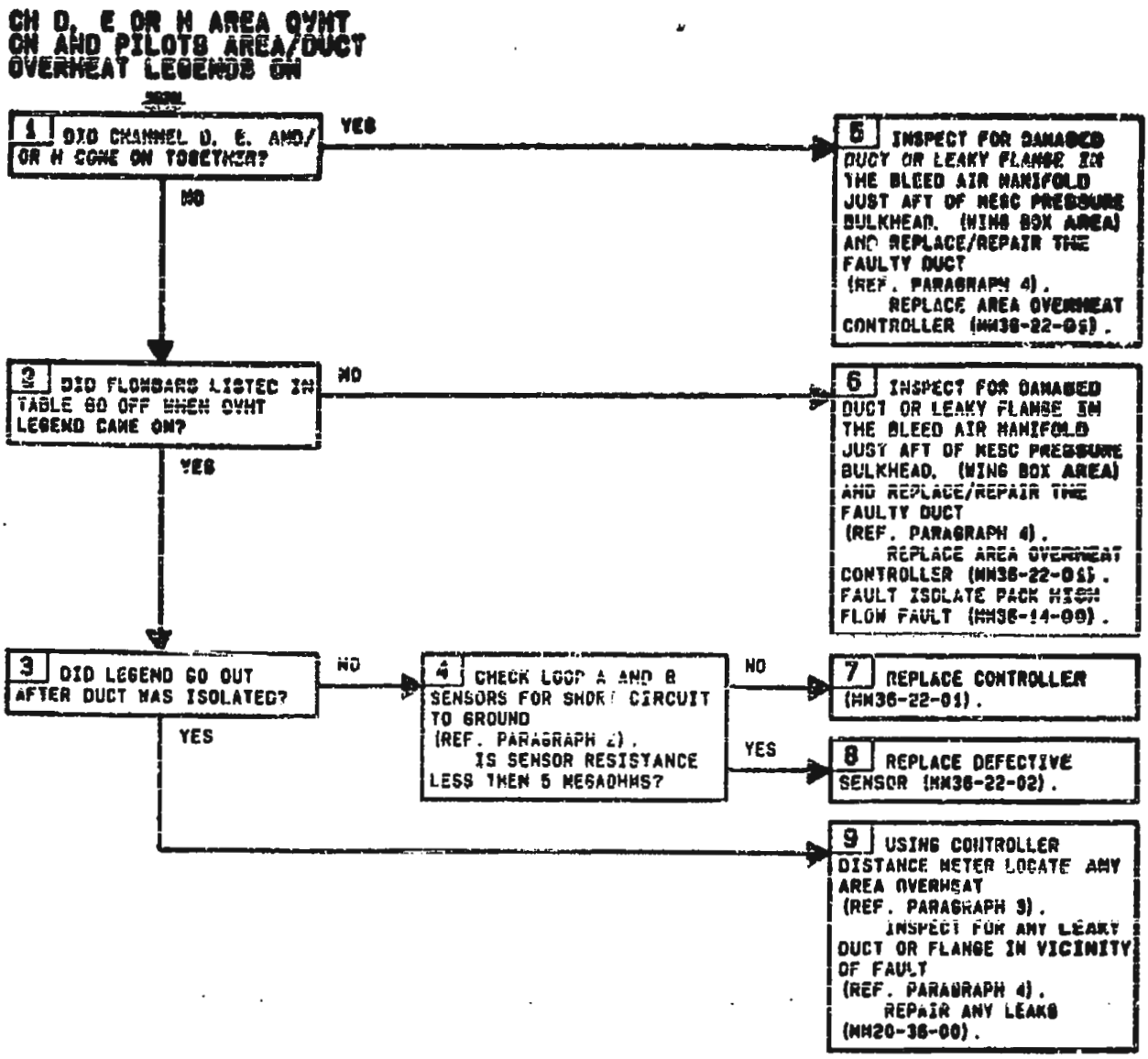
NOTE

/1\ SINCE LENGTH OF EACH LEFT AND RIGHT WING ANTI-ICE CHANNEL (F, G) IS VERY SMALL, USE OF COUNTER READING IN LOCATING LEAKS WILL NOT BE ACCURATE. INSPECT WING ANTI-ICE DUCT SECTION BETWEEN WING ANTI-ICE VALVE AND ANTI-ICE TELESCOPIC DUCT FOR ANY DAMAGED SECTION AND REPLACE OR REPAIR AS NECCESARY.

M1-0003-36-0002

Channel D, E, or H AREA OVHT or LEFT or RIGHT Wing
Anti-ice DUCT FAIL Light On, Pilots AREA/DUCT OVERHEAT Light On
Figure 104

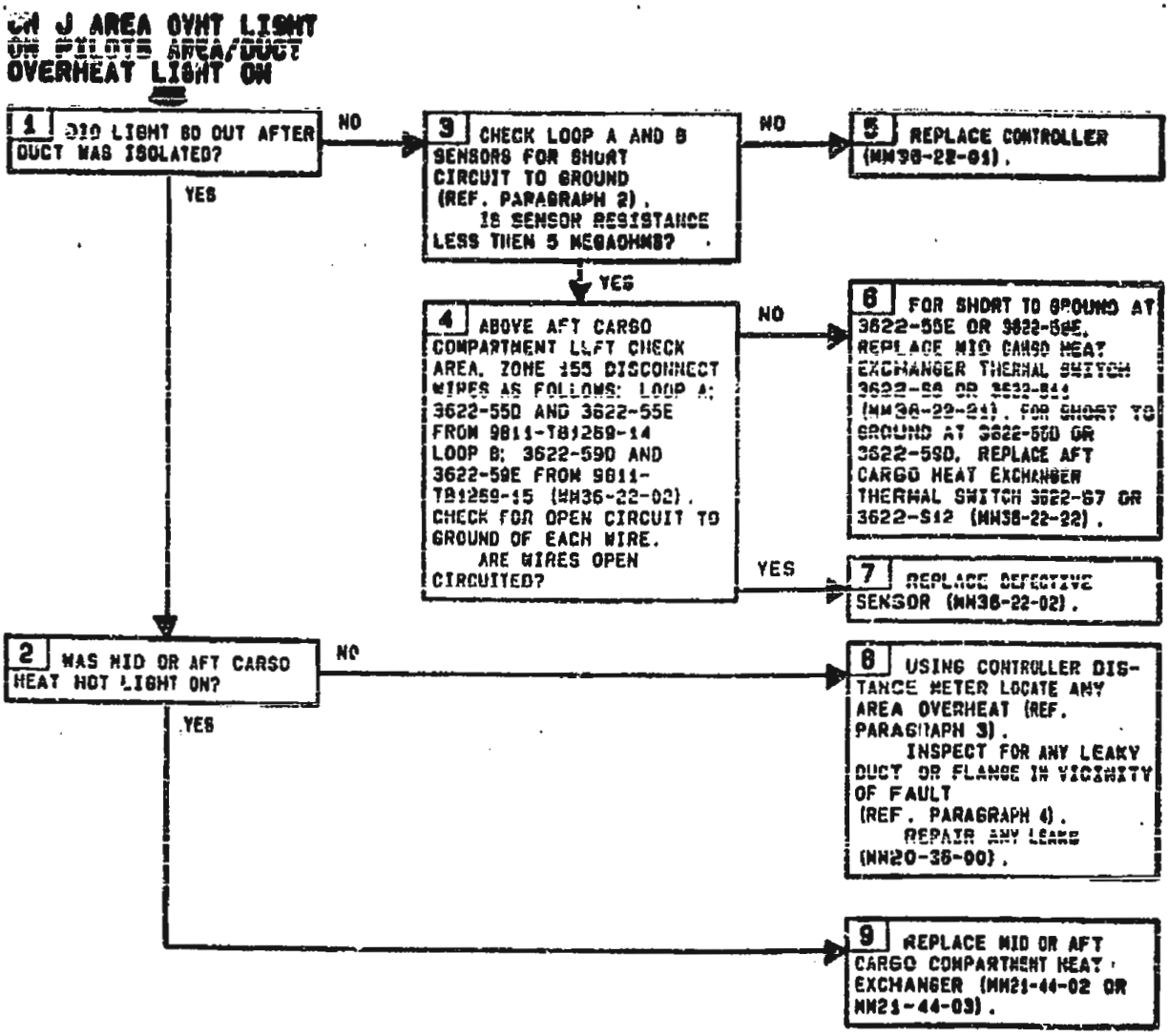
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: 2NB; 3W13, 14


CH D, E OR H AREA OVHT ON AND PILOTS AREA/DUCT OVERHEAT LEGENDS ON
1 DID CHANNEL D, E, AND/OR H COME ON TOGETHER?
YES
NO
5 INSPECT FOR DAMAGED DUCT OR LEAKY FLANGE IN THE BLEED AIR MANIFOLD JUST AFT OF NESC PRESSURE BULKHEAD. (WING BOX AREA) AND REPLACE/REPAIR THE FAULTY DUCT (REF. PARAGRAPH 4). REPLACE AREA OVERHEAT CONTROLLER (MM36-22-01).
2 DID FLOWBARS LISTED IN TABLE GO OFF WHEN OVHT LEGEND CAME ON?
NO
YES
6 INSPECT FOR DAMAGED DUCT OR LEAKY FLANGE IN THE BLEED AIR MANIFOLD JUST AFT OF NESC PRESSURE BULKHEAD. (WING BOX AREA) AND REPLACE/REPAIR THE FAULTY DUCT (REF. PARAGRAPH 4). REPLACE AREA OVERHEAT CONTROLLER (MM36-22-01). FAULT ISOLATE PACK HIGH FLOW FAULT (MM36-14-00).
3 DID LEGEND GO OUT AFTER DUCT WAS ISOLATED?
NO
YES
4 CHECK LOOP A AND B SENSORS FOR SHORT CIRCUIT TO GROUND (REF. PARAGRAPH 2). IS SENSOR RESISTANCE LESS THEN 5 MEGAOHMS?
NO
YES
7 REPLACE CONTROLLER (MM36-22-01).
8 REPLACE DEFECTIVE SENSOR (MM36-22-02).
9 USING CONTROLLER DISTANCE METER LOCATE ANY AREA OVERHEAT (REF. PARAGRAPH 3). INSPECT FOR ANY LEAKY DUCT OR FLANGE IN VICINITY OF FAULT (REF. PARAGRAPH 4). REPAIR ANY LEAKS (MM20-36-00).

AREA OVHT	FLOWBARS OFF				
	PACK FLOW CONTROL	ENG ISLN VALVE	APT ISLN VALVE	LT X-BLD	RT X-BLD
D	1	1	-	YES	-
H	2	-	YES	-	YES
E	3	3	-	YES	YES

R Channel D, E, or H AREA OVHT Legend On, Pilots AREA/DUCT OVERHEAT Legend On
R Figure 104
R

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB'S: 3M8, 3M13, 14


CH J AREA OVHT LIGHT ON PILOTS AREA/DUCT OVERHEAT LIGHT ON
1 DID LIGHT GO OUT AFTER DUCT WAS ISOLATED?
NO
YES
3 CHECK LOOP A AND B SENSORS FOR SHORT CIRCUIT TO GROUND (REF. PARAGRAPH 2). IS SENSOR RESISTANCE LESS THEN 5 MEGAOHMS?
NO
YES
5 REPLACE CONTROLLER (MM36-22-01).
4 ABOVE AFT CARGO COMPARTMENT LEFT CHECK AREA. ZONE 155 DISCONNECT WIRES AS FOLLOWS: LOOP A: 3622-55D AND 3622-55E FROM 9811-TB1259-14 LOOP B: 3622-59D AND 3622-59E FROM 9811-TB1259-15 (MM36-22-02). CHECK FOR OPEN CIRCUIT TO GROUND OF EACH WIRE. ARE WIRES OPEN CIRCUITED?
NO
YES
6 FOR SHORT TO GROUND AT 3622-55E OR 3622-59E, REPLACE MID CARGO HEAT EXCHANGER THERMAL SWITCH 3622-58 OR 3622-S44 (MM36-22-21). FOR SHORT TO GROUND AT 3622-55D OR 3622-59D, REPLACE AFT CARGO HEAT EXCHANGER THERMAL SWITCH 3622-67 OR 3622-S12 (MM36-22-22).
7 REPLACE DEFECTIVE SENSOR (MM36-22-02).
2 WAS MID OR AFT CARGO HEAT HOT LIGHT ON?
NO
YES
8 USING CONTROLLER DISTANCE METER LOCATE ANY AREA OVERHEAT (REF. PARAGRAPH 3). INSPECT FOR ANY LEAKY DUCT OR FLANGE IN VICINITY OF FAULT (REF. PARAGRAPH 4). REPAIR ANY LEAKS (MM20-36-00).
9 REPLACE MID OR AFT CARGO COMPARTMENT HEAT EXCHANGER (MM21-44-02 OR MM21-44-03).

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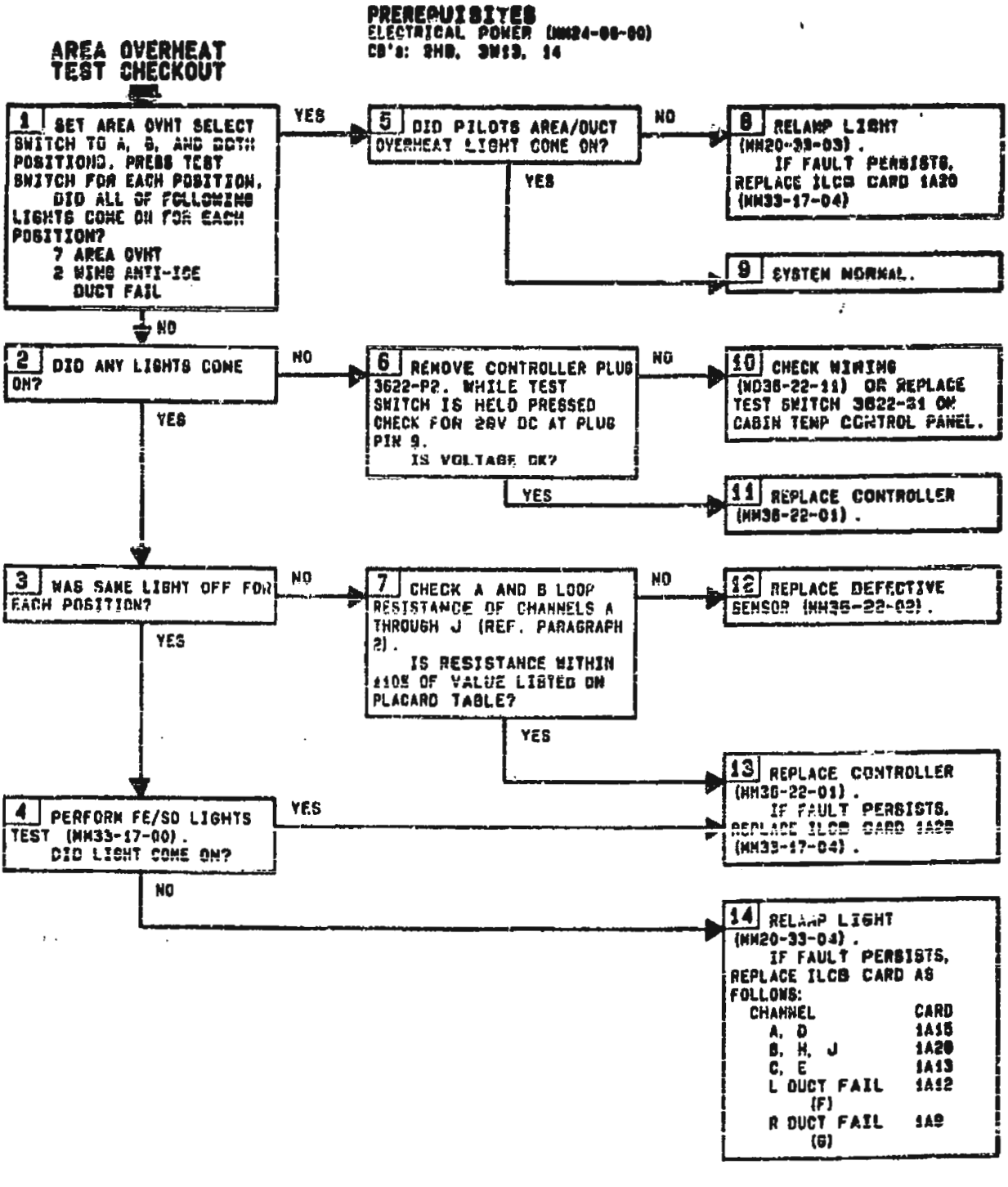
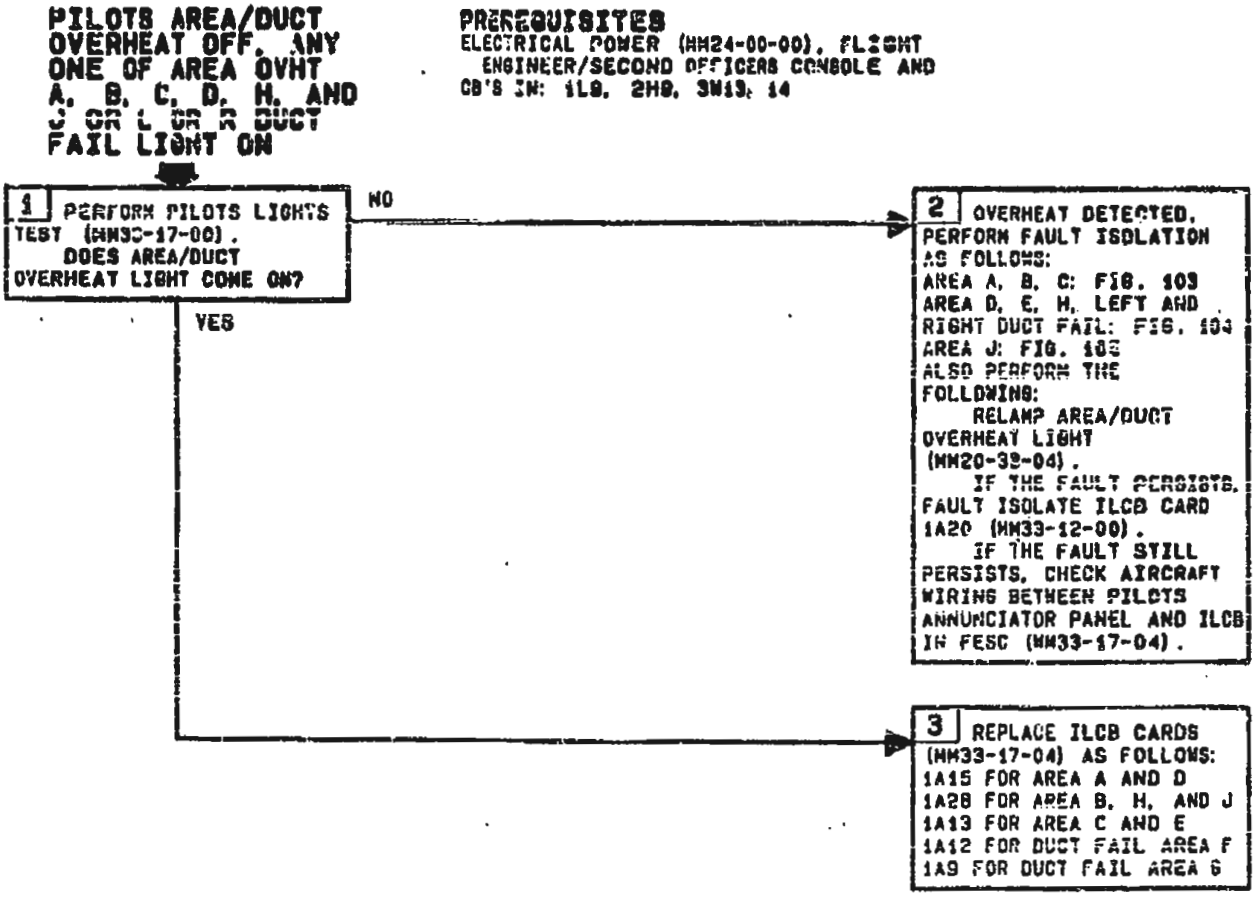
R Channel J AREA OVHT Light On, Pilots AREA/DUCT OVERHEAT
R Light On
R Figure 105


PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB's: 3HB, 3W13, 14
AREA OVERHEAT TEST CHECKOUT
1 SET AREA OVHT SELECT SWITCH TO A, B, AND BOTH POSITIONS. PRESS TEST SWITCH FOR EACH POSITION. DID ALL OF FOLLOWING LIGHTS COME ON FOR EACH POSITION?
7 AREA OVHT
2 WING ANTI-ICE DUCT FAIL
YES
NO
2 DID ANY LIGHTS COME ON?
NO
YES
3 WAS SAME LIGHT OFF FOR EACH POSITION?
NO
YES
4 PERFORM FE/SO LIGHTS TEST (MM33-17-00). DID LIGHT COME ON?
YES
NO
5 DID PILOTS AREA/DUCT OVERHEAT LIGHT COME ON?
NO
YES
6 REMOVE CONTROLLER PLUG 3622-P2. WHILE TEST SWITCH IS HELD PRESSED CHECK FOR 28V DC AT PLUG PIN 9. IS VOLTAGE OK?
NO
YES
7 CHECK A AND B LOOP RESISTANCE OF CHANNELS A THROUGH J (REF. PARAGRAPH 2). IS RESISTANCE WITHIN ±10% OF VALUE LISTED ON PLACARD TABLE?
NO
YES
8 RELAMP LIGHT (MM20-33-03). IF FAULT PERSISTS, REPLACE ILCB CARD 1A20 (MM33-17-04)
9 SYSTEM NORMAL.
10 CHECK WIRING (WD36-22-11) OR REPLACE TEST SWITCH 3622-31 ON CABIN TEMP CONTROL PANEL.
11 REPLACE CONTROLLER (MM36-22-01).
12 REPLACE DEFECTIVE SENSOR (MM36-22-02).
13 REPLACE CONTROLLER (MM36-22-01). IF FAULT PERSISTS, REPLACE ILCB CARD 1A20 (MM33-17-04).
14 RELAMP LIGHT (MM20-33-04). IF FAULT PERSISTS, REPLACE ILCB CARD AS FOLLOWS:
CHANNEL CARD
A, D 1A15
B, H, J 1A20
C, E 1A13
L DUCT FAIL (F) 1A12
R DUCT FAIL (G) 1A9

M1-0008-36-5024

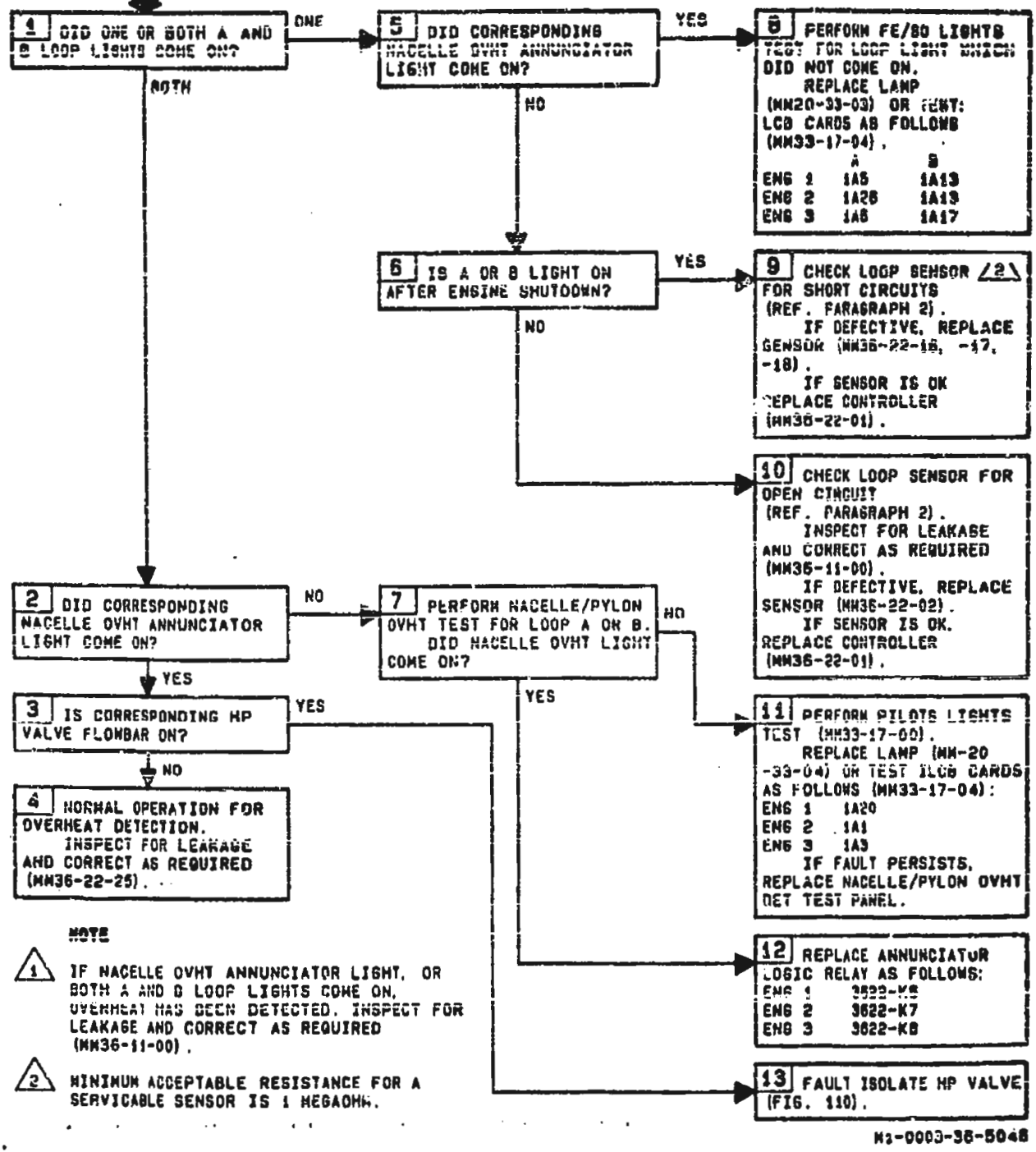
R R Area Overheat Test Checkout
Figure 106


PILOTS AREA/DUCT OVERHEAT OFF, ANY ONE OF AREA OVHT A, B, C, D, H, AND J OR L OR R DUCT FAIL LIGHT ON
PREREQUISITES
ELECTRICAL POWER (MM24-00-00), FLIGHT ENGINEER/SECOND OFFICERS CONSOLE AND CB'S IN: 1L9, 2H9, 3N13, 14
1 PERFORM PILOTS LIGHTS TEST (MM33-17-00). DOES AREA/DUCT OVERHEAT LIGHT COME ON?
NO
YES
2 OVERHEAT DETECTED, PERFORM FAULT ISOLATION AS FOLLOWS:
AREA A, B, C: FIG. 103
AREA D, E, H, LEFT AND RIGHT DUCT FAIL: FIG. 104
AREA J: FIG. 105
ALSO PERFORM THE FOLLOWING:
RELAMP AREA/DUCT OVERHEAT LIGHT (MM20-30-04).
IF THE FAULT PERSISTS, FAULT ISOLATE ILCB CARD 1A20 (MM33-12-00).
IF THE FAULT STILL PERSISTS, CHECK AIRCRAFT WIRING BETWEEN PILOTS ANNUNCIATOR PANEL AND ILCB IN FESC (MM33-17-04).
3 REPLACE ILCB CARDS (MM33-17-04) AS FOLLOWS:
1A15 FOR AREA A AND D
1A28 FOR AREA B, H, AND J
1A13 FOR AREA C AND E
1A12 FOR DUCT FAIL AREA F
1A9 FOR DUCT FAIL AREA G

M1-0094-36-8037

R Any One of AREA OVHT Areas A,B,C,D,E,H and J or LEFT or RIGHT
R DUCT FAIL Light On, Pilots AREA/DUCT OVERHEAT Light Off
R Figure 107

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: CB2-H9
CB3-L1, 2, 3, 4, 7, 8, 9, 10, 13, 14, 15, 16


NACELLE/PYLON OVERHEAT PROBLEM 1
1 DID ONE OR BOTH A AND B LOOP LIGHTS COME ON?
ONE
BOTH
5 DID CORRESPONDING NACELLE OVHT ANNUNCIATOR LIGHT COME ON?
YES
NO
8 PERFORM FE/SO LIGHTS TEST FOR LOOP LIGHT WHICH DID NOT COME ON.
REPLACE LAMP (MM20-33-03) OR TEST LCB CARDS AS FOLLOWS (MM33-17-04).
A B
ENG 1 1A5 1A13
ENG 2 1A26 1A13
ENG 3 1A6 1A17
6 IS A OR B LIGHT ON AFTER ENGINE SHUTDOWN?
YES
NO
9 CHECK LOOP SENSOR 2 FOR SHORT CIRCUITS (REF. PARAGRAPH 2).
IF DEFECTIVE, REPLACE SENSOR (MM36-22-16, -17, -18).
IF SENSOR IS OK REPLACE CONTROLLER (MM36-22-01).
10 CHECK LOOP SENSOR FOR OPEN CIRCUIT (REF. PARAGRAPH 2).
INSPECT FOR LEAKAGE AND CORRECT AS REQUIRED (MM36-11-00).
IF DEFECTIVE, REPLACE SENSOR (MM36-22-02).
IF SENSOR IS OK, REPLACE CONTROLLER (MM36-22-01).
2 DID CORRESPONDING NACELLE OVHT ANNUNCIATOR LIGHT COME ON?
NO
YES
7 PERFORM NACELLE/PYLON OVHT TEST FOR LOOP A OR B. DID NACELLE OVHT LIGHT COME ON?
NO
YES
3 IS CORRESPONDING HP VALVE FLOWBAR ON?
YES
NO
4 NORMAL OPERATION FOR OVERHEAT DETECTION.
INSPECT FOR LEAKAGE AND CORRECT AS REQUIRED (MM36-22-25).
11 PERFORM PILOTS LIGHTS TEST (MM33-17-00).
REPLACE LAMP (MM-20-33-04) OR TEST LCB CARDS AS FOLLOWS (MM33-17-04):
ENG 1 1A20
ENG 2 1A1
ENG 3 1A3
IF FAULT PERSISTS, REPLACE NACELLE/PYLON OVHT DET TEST PANEL.
12 REPLACE ANNUNCIATOR LOGIC RELAY AS FOLLOWS:
ENG 1 3622-K6
ENG 2 3622-K7
ENG 3 3622-K8
13 FAULT ISOLATE HP VALVE (FIG. 110).

NOTE

1 IF NACELLE OVHT ANNUNCIATOR LIGHT, OR BOTH A AND B LOOP LIGHTS COME ON, OVERHEAT HAS BEEN DETECTED. INSPECT FOR LEAKAGE AND CORRECT AS REQUIRED (MM36-11-00).

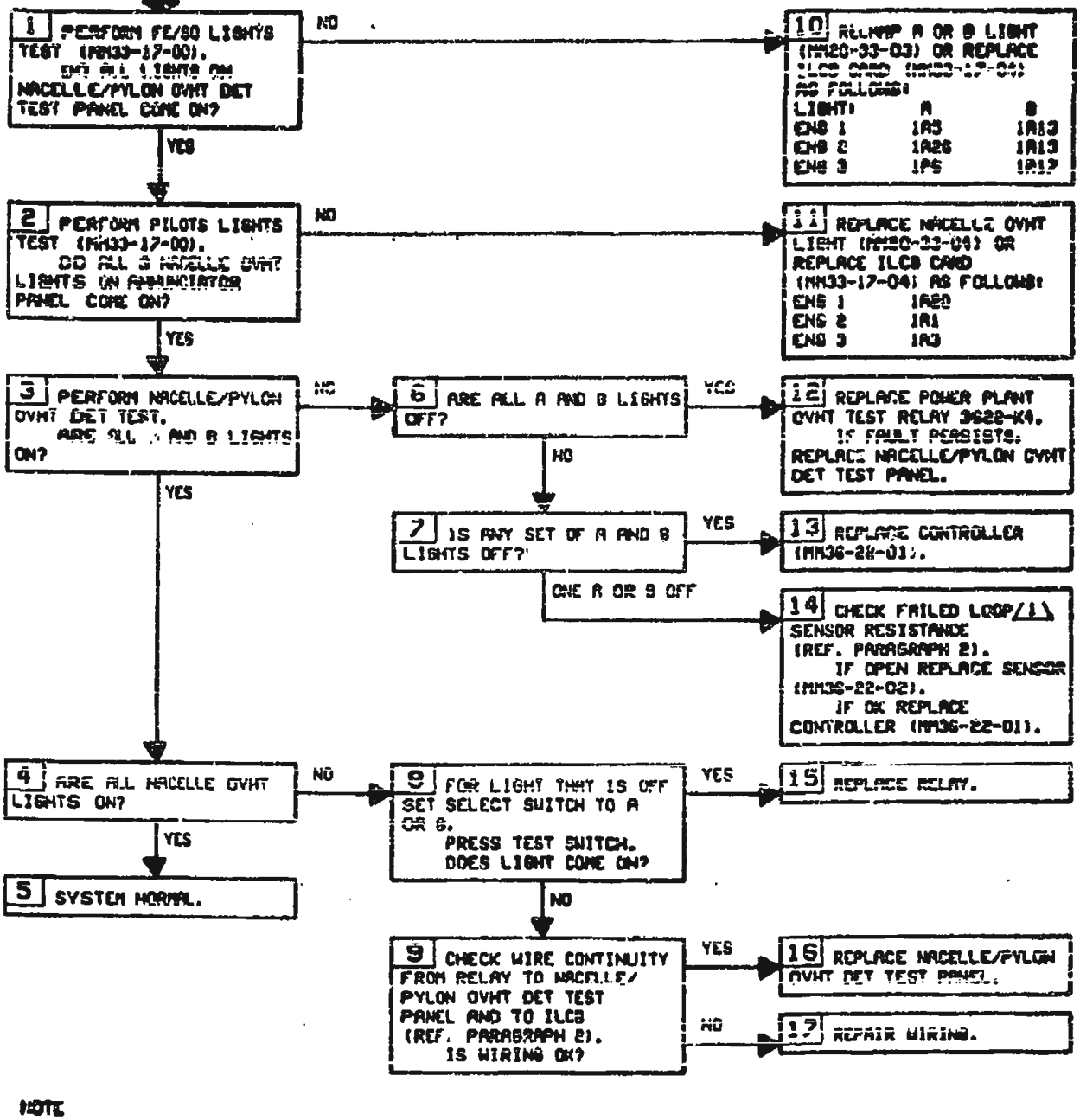
2 MINIMUM ACCEPTABLE RESISTANCE FOR A SERVICABLE SENSOR IS 1 MEGAOHM.

M1-0003-36-5048

R R NACELLE/PYLON OVHT Light Problem
Figure 108

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 2H9, 3L1 THRU 3L4, 3L7 THRU 3L10, 3L13 THRU 3L18

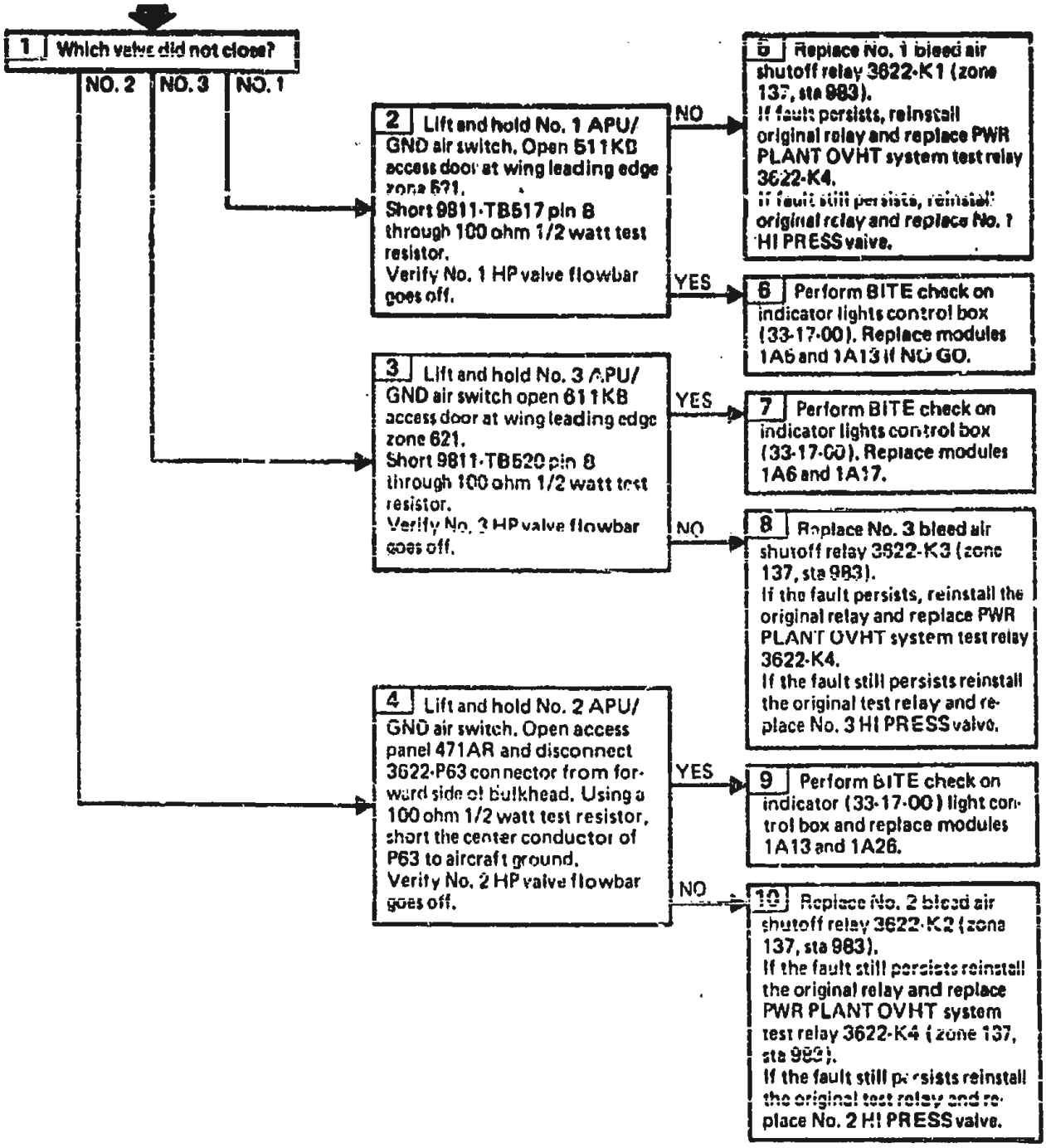
NACELLE/PYLON DET TEST OVHT PROBLEMS


1 PERFORM FE/SO LIGHTS TEST (MM33-17-00). DID ALL LIGHTS ON NACELLE/PYLON OVHT DET TEST PANEL COME ON?
NO
YES
10 RELAMP A OR B LIGHT (MM20-33-03) OR REPLACE ILCB CARD (MM33-17-04) AS FOLLOWS:
LIGHT: A B
ENG 1 1A5 1A13
ENG 2 1A26 1A13
ENG 3 1P6 1P17
2 PERFORM PILOTS LIGHTS TEST (MM33-17-00). DID ALL 3 NACELLE OVHT LIGHTS ON ANNUNCIATOR PANEL COME ON?
NO
YES
11 REPLACE NACELLE OVHT LIGHT (MM20-33-04) OR REPLACE ILCB CARD (MM33-17-04) AS FOLLOWS:
ENG 1 1A20
ENG 2 1A1
ENG 3 1A3
3 PERFORM NACELLE/PYLON OVHT DET TEST. ARE ALL A AND B LIGHTS ON?
NO
YES
6 ARE ALL A AND B LIGHTS OFF?
YES
NO
12 REPLACE POWER PLANT OVHT TEST RELAY 3G28-K4. IF FAULT PERSISTS, REPLACE NACELLE/PYLON OVHT DET TEST PANEL.
7 IS ANY SET OF A AND B LIGHTS OFF?
YES
13 REPLACE CONTROLLER (MM36-22-01).
ONE A OR B OFF
14 CHECK FAILED LOOP/1\ SENSOR RESISTANCE (REF. PARAGRAPH 2). IF OPEN REPLACE SENSOR (MM36-22-02). IF OK REPLACE CONTROLLER (MM36-22-01).
4 ARE ALL NACELLE OVHT LIGHTS ON?
NO
YES
8 FOR LIGHT THAT IS OFF SET SELECT SWITCH TO A OR B. PRESS TEST SWITCH. DOES LIGHT COME ON?
YES
15 REPLACE RELAY.
NO
5 SYSTEM NORMAL.
9 CHECK WIRE CONTINUITY FROM RELAY TO NACELLE/PYLON OVHT DET TEST PANEL AND TO ILCB (REF. PARAGRAPH 2). IS WIRING OK?
YES
16 REPLACE NACELLE/PYLON OVHT DET TEST PANEL.
NO
17 REPAIR WIRING.

NOTE

1 MINIMUM ACCEPTABLE RESISTANCE FOR A SERVICABLE SENSOR IN 1 MEGAOHM

NACELLE/PYLON OVHT Test Problem
Figure 109

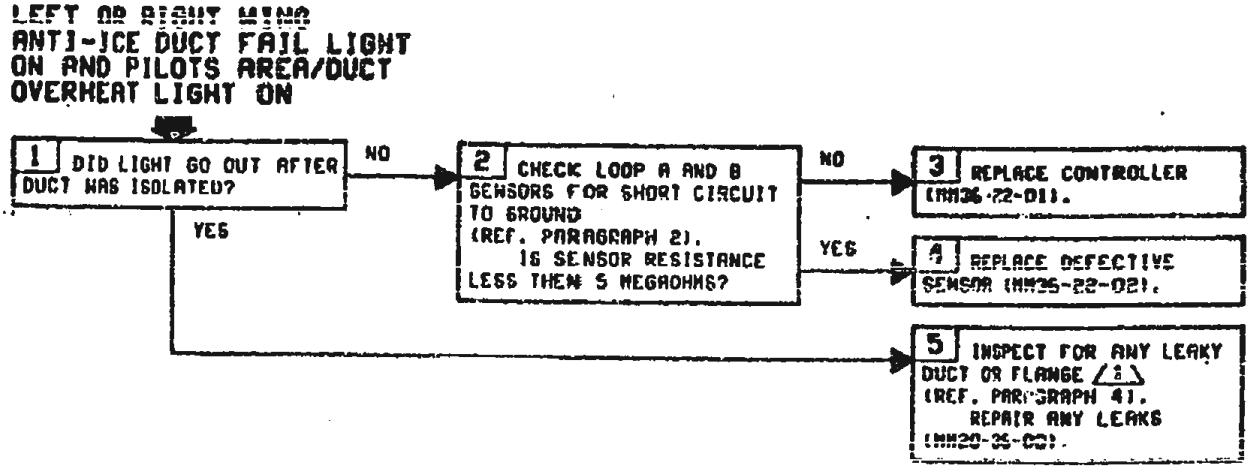

1 Which valve did not close?
NO. 2
NO. 3
NO. 1
2 Lift and hold No. 1 APU/GND air switch. Open 511KB access door at wing leading edge zone 621.
Short 9811-TB517 pin 8 through 100 ohm 1/2 watt test resistor.
Verify No. 1 HP valve flowbar goes off.
NO
5 Replace No. 1 bleed air shutoff relay 3622-K1 (zone 137, sta 983).
If fault persists, reinstall original relay and replace PWR PLANT OVHT system test relay 3622-K4.
If fault still persists, reinstall original relay and replace No. 1 HI PRESS valve.
YES
6 Perform BITE check on indicator lights control box (33-17-00). Replace modules 1A6 and 1A13 if NO GO.
3 Lift and hold No. 3 APU/GND air switch open 611KB access door at wing leading edge zone 621.
Short 9811-TB520 pin 8 through 100 ohm 1/2 watt test resistor.
Verify No. 3 HP valve flowbar goes off.
YES
7 Perform BITE check on indicator lights control box (33-17-00). Replace modules 1A6 and 1A17.
NO
8 Replace No. 3 bleed air shutoff relay 3622-K3 (zone 137, sta 983).
If the fault persists, reinstall the original relay and replace PWR PLANT OVHT system test relay 3622-K4.
If the fault still persists reinstall the original test relay and replace No. 3 HI PRESS valve.
4 Lift and hold No. 2 APU/GND air switch. Open access panel 471AR and disconnect 3622-P63 connector from forward side of bulkhead. Using a 100 ohm 1/2 watt test resistor, short the center conductor of P63 to aircraft ground.
Verify No. 2 HP valve flowbar goes off.
YES
9 Perform BITE check on indicator (33-17-00) light control box and replace modules 1A13 and 1A26.
NO
10 Replace No. 2 bleed air shutoff relay 3622-K2 (zone 137, sta 983).
If the fault still persists reinstall the original relay and replace PWR PLANT OVHT system test relay 3622-K4 (zone 137, sta 983).
If the fault still persists reinstall the original test relay and replace No. 2 HI PRESS valve.

PREREQUISITES
Electrical Power (24-00-00), Pneumatic Power (36-00-00).
CB's in 1G10-18, 1H16-18, 2H9, 3L1-4, 3L7-10, 3L13-16.

M1-0100-36-5033

Any One of HI PRESS Valve Did Not Close With NACELLE/PYLON OVHT Light On and Pilots NACELLE (1,2,3) OVHT ON
Figure 110

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
PNEUMATIC POWER (MM36-00-00)
CB: 6: 2M9: 3M13, 14

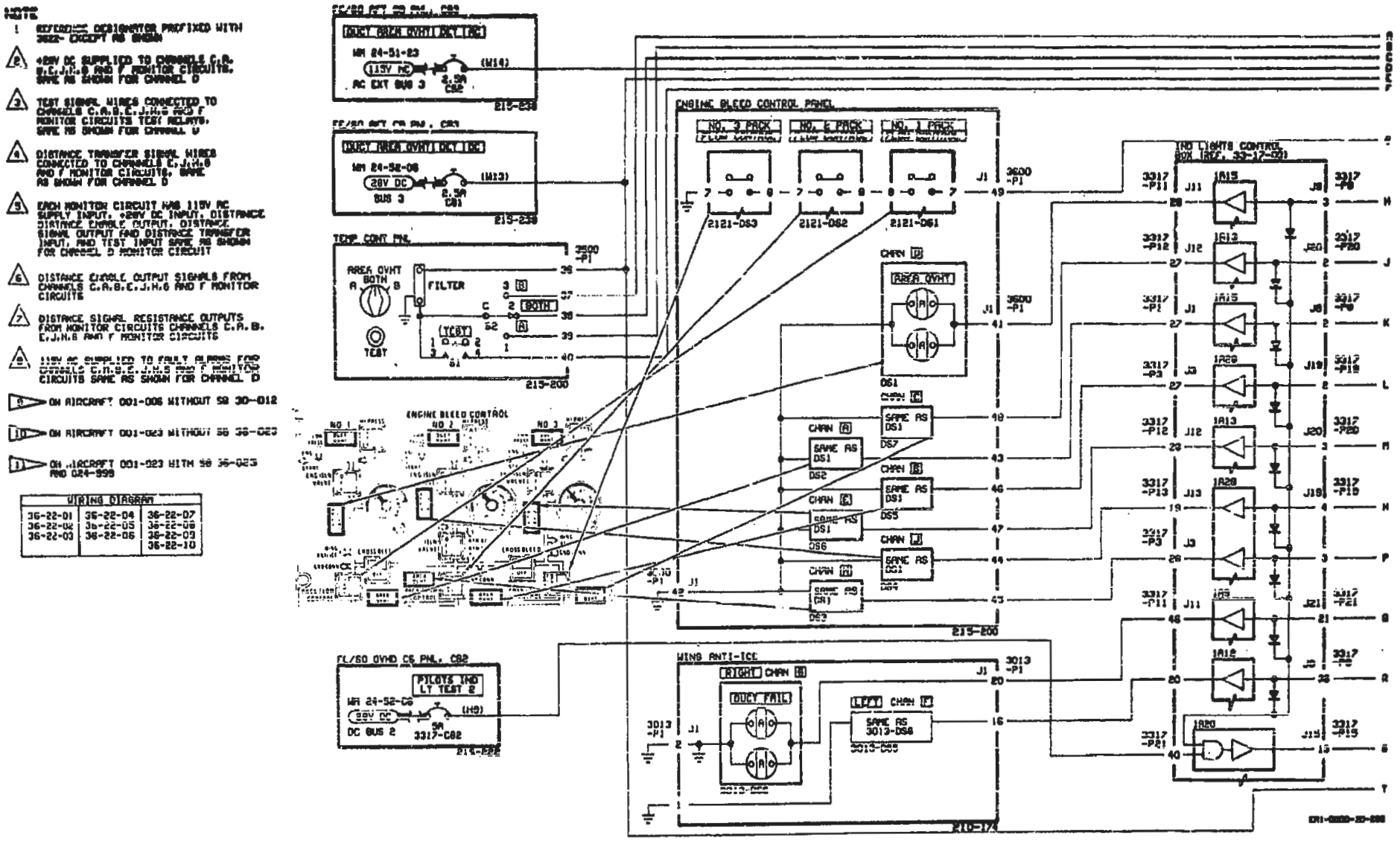

LEFT OR RIGHT WING
ANTI-ICE DUCT FAIL LIGHT
ON AND PILOTS AREA/DUCT
OVERHEAT LIGHT ON
1 DID LIGHT GO OUT AFTER DUCT WAS ISOLATED?
NO
YES
2 CHECK LOOP A AND B SENSORS FOR SHORT CIRCUIT TO GROUND (REF. PARAGRAPH 2). IS SENSOR RESISTANCE LESS THEN 5 MEGAOHMS?
NO
YES
3 REPLACE CONTROLLER (MM36-22-01).
4 REPLACE DEFECTIVE SENSOR (MM36-22-02).
5 INSPECT FOR ANY LEAKY DUCT OR FLANGE /1\ (REF. PARAGRAPH 4). REPAIR ANY LEAKS (MM20-36-00).

NOTE

/1\ SINCE LENGTH OF EACH LEFT AND RIGHT WING ANTI-ICE CHANNEL (F, 6) IS VERY SMALL, USE OF COUNTER READING IN LOCATING LEAKS WILL NOT BE ACCURATE. INSPECT WING ANTI-ICE DUCT SECTION BETWEEN WING ANTI-ICE VALVE AND ANTI-ICE TELESCOPIC DUCT FOR ANY DAMAGED SECTION AND REPLACE OR REPAIR AS NECCESARY.

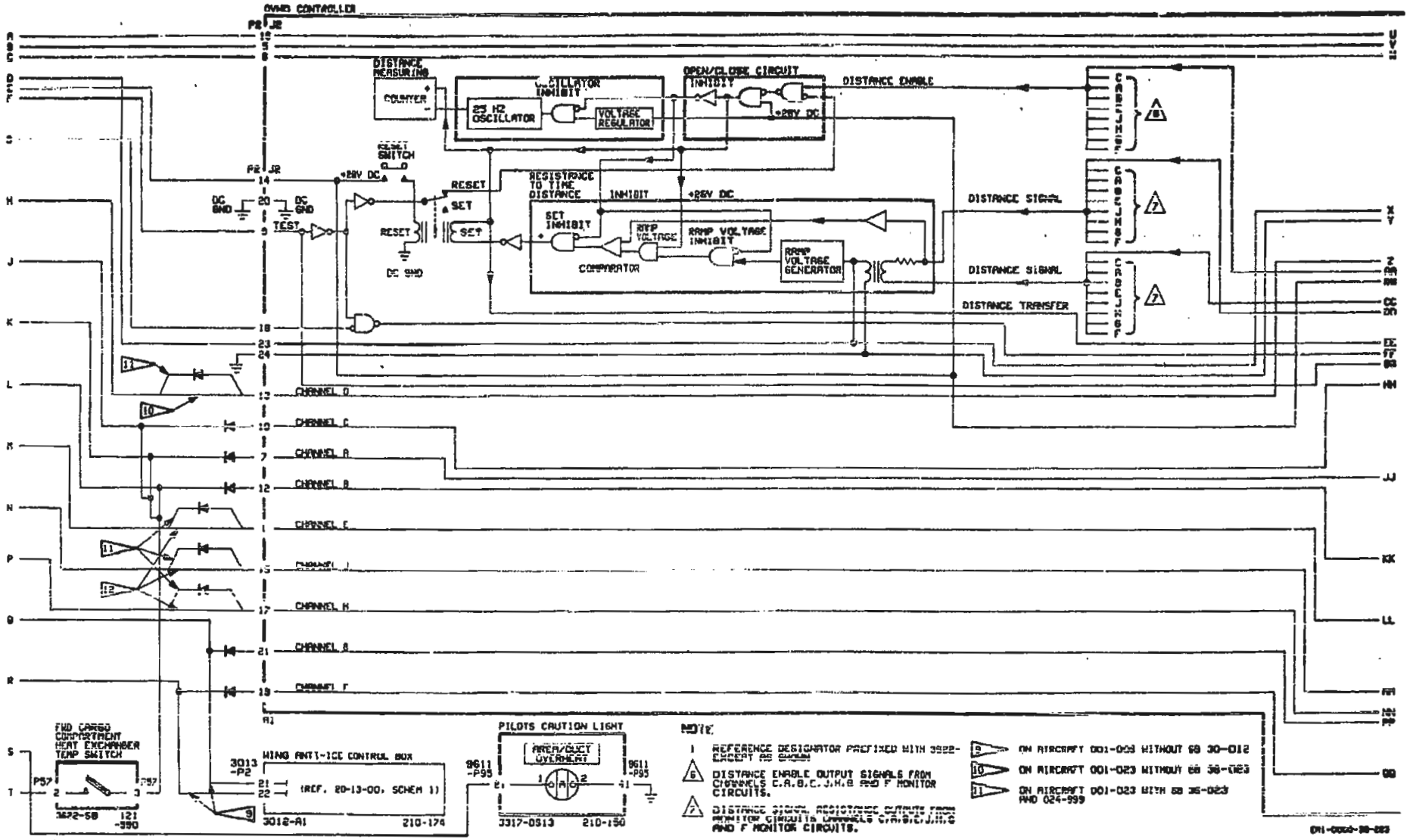
P1-0000-36-389

LEFT or RIGHT Wing Anti-Ice DUCT FAIL Legend On,
Pilots AREA/DUCT OVERHEAT Legend On
Figure 111



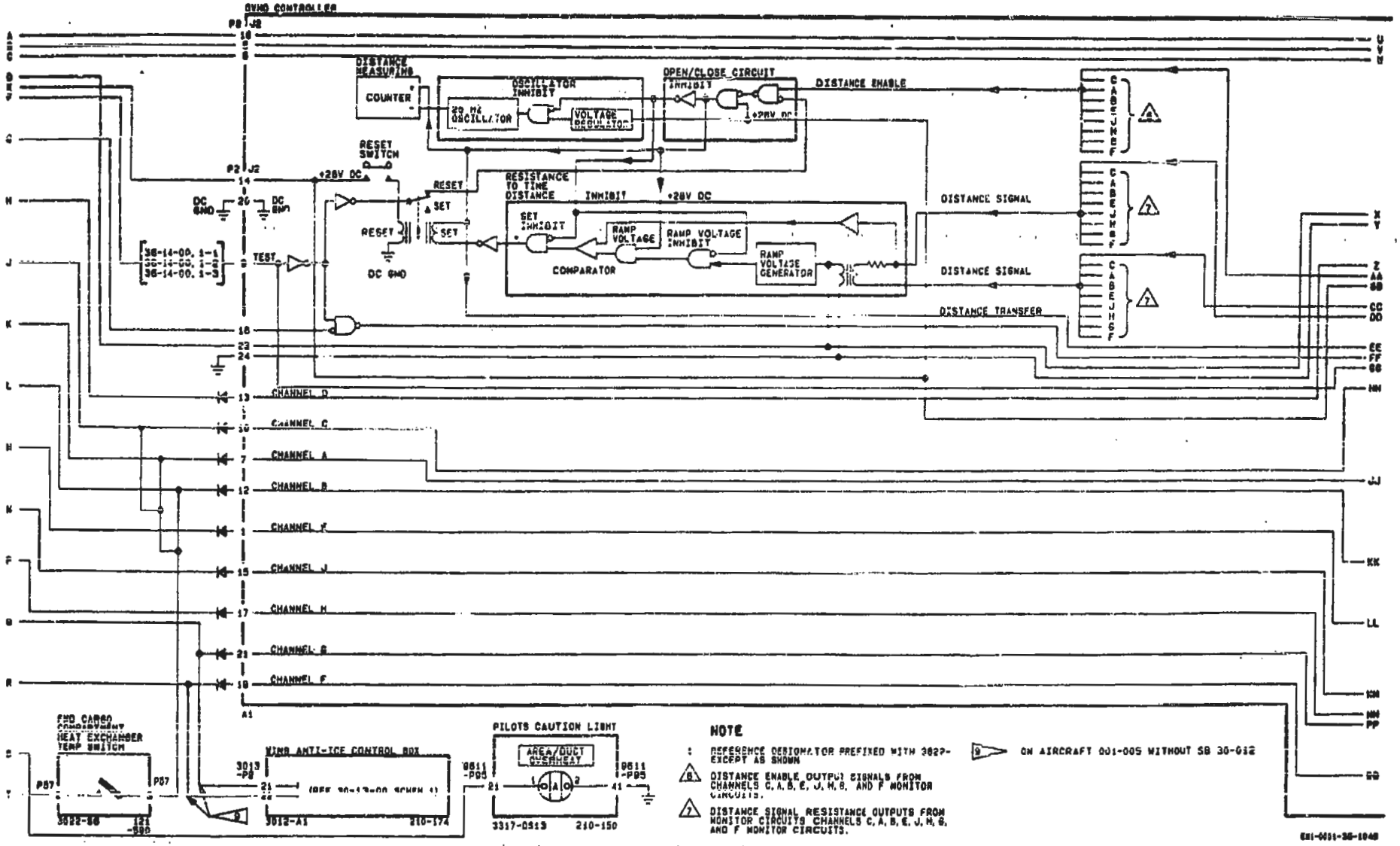
Fuselage and Wing Area Overheat System Electrical Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: 001-033
R
001B



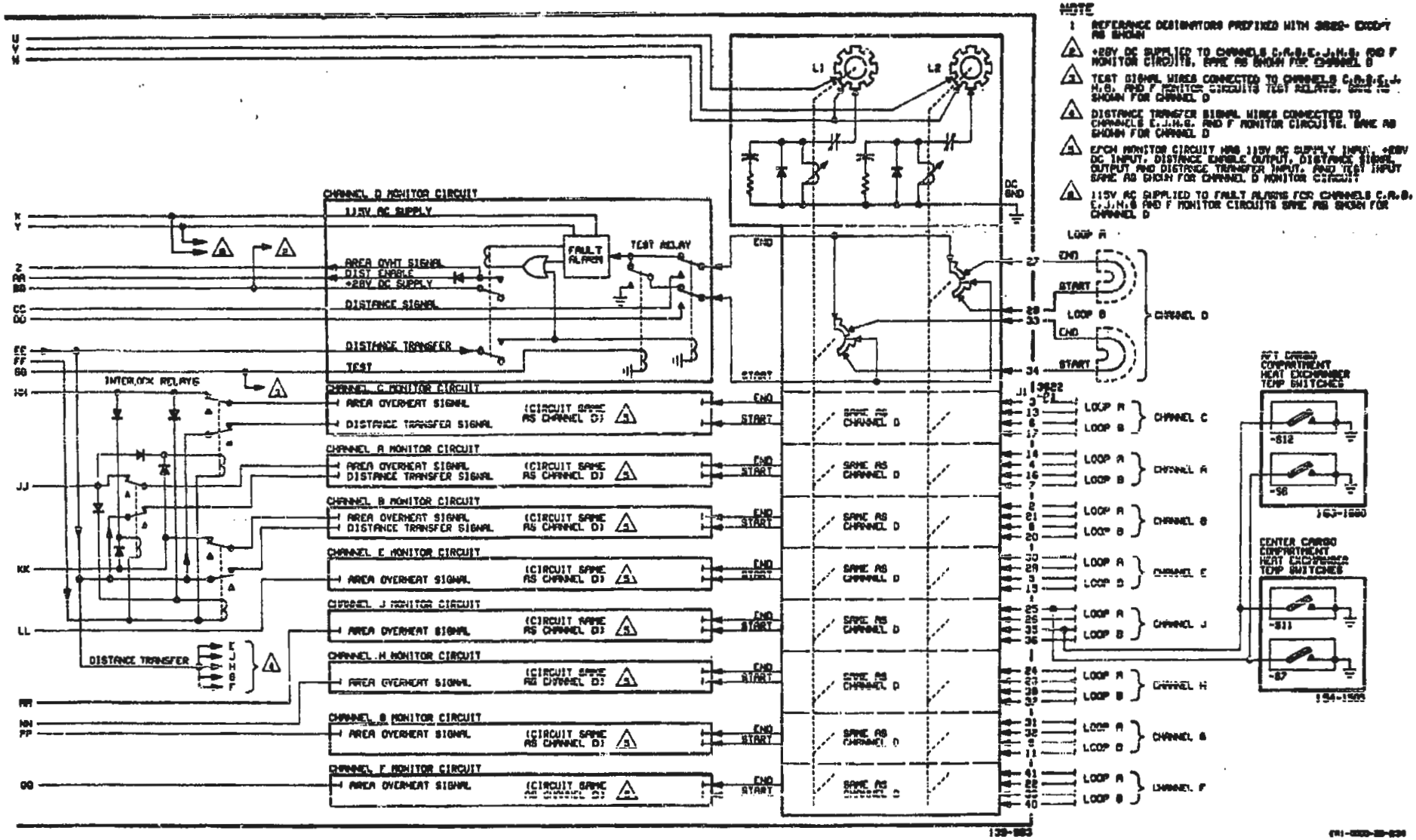
Fuselage and Wing Area Overheat System Electrical Schematic
SCHEM 1 (Sheet 2)

R
R
001B EFFECTIVITY: 001-033 WITHOUT SB21-214

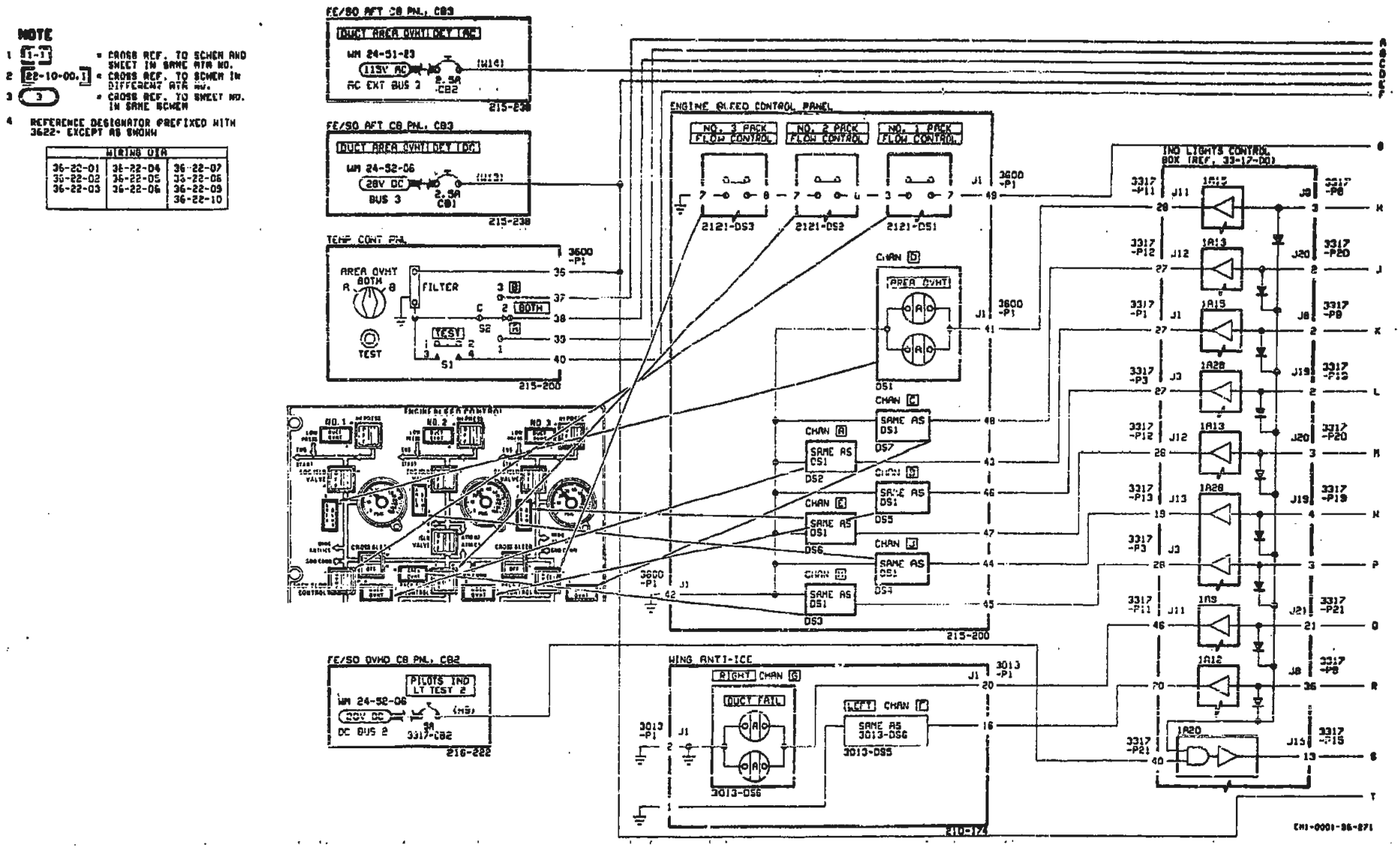


R Fuselage and Wing Area Overheat System Electrical Schematic
R SCHEM 1 (Sheet 2)

EFFECTIVITY: 001-033 WITH SB21-214

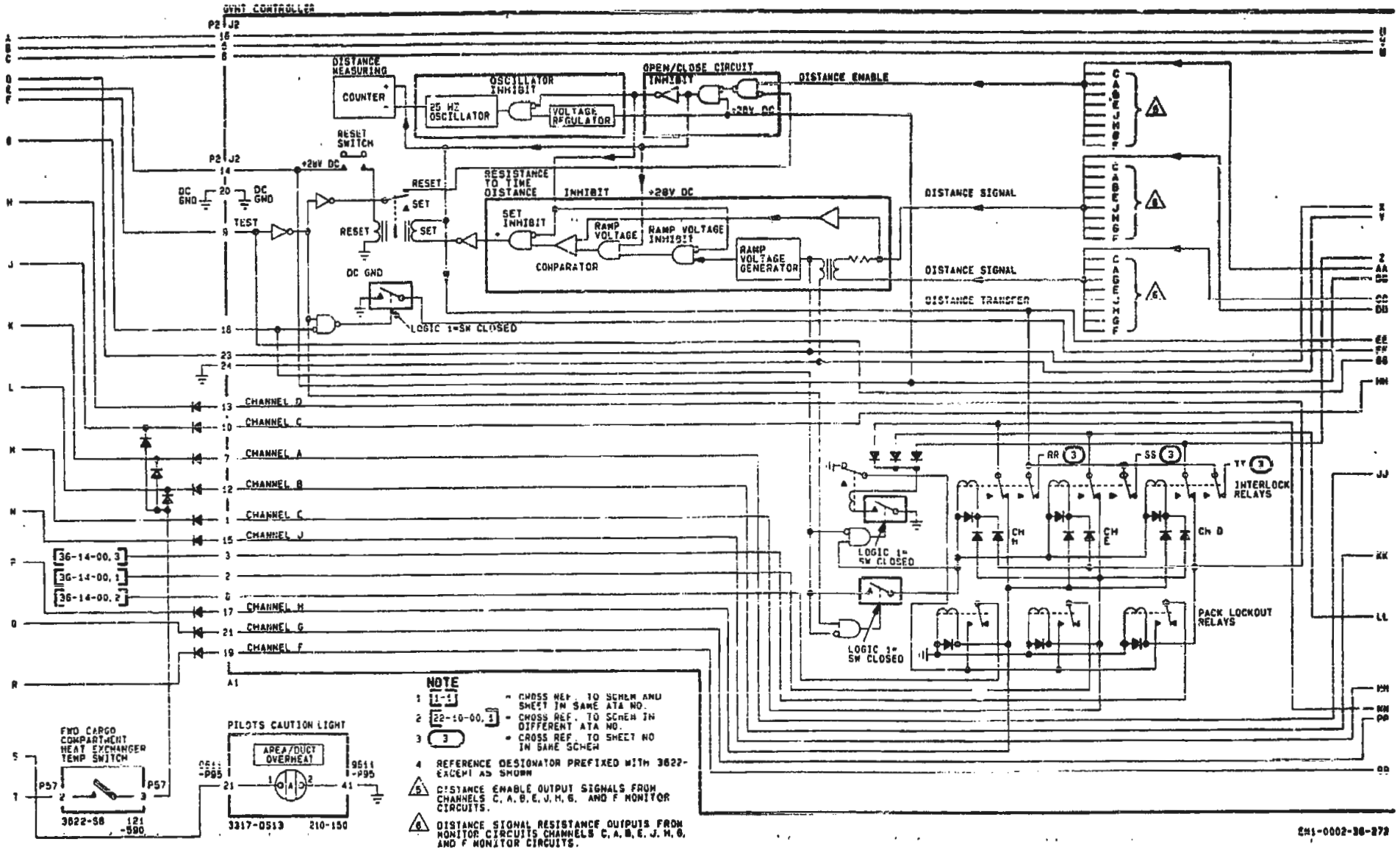

NOTE
1 REFERENCE DESIGNATORS PREFIXED WITH 3822- EXCEPT AS SHOWN
2 +28V DC SUPPLIED TO CHANNELS C,A,B,E,J,H,G AND F MONITOR CIRCUITS. SAME AS SHOWN FOR CHANNEL D
3 TEST SIGNAL WIRES CONNECTED TO CHANNELS C,A,B,E,J,H,G, AND F MONITOR CIRCUITS TEST RELAYS. SAME AS SHOWN FOR CHANNEL D
4 DISTANCE TRANSFER SIGNAL WIRES CONNECTED TO CHANNELS E,J,H,G, AND F MONITOR CIRCUITS. SAME AS SHOWN FOR CHANNEL D
5 EACH MONITOR CIRCUIT HAS 115V AC SUPPLY INPUT, +28V DC INPUT, DISTANCE ENABLE OUTPUT, DISTANCE SIGNAL OUTPUT AND DISTANCE TRANSFER INPUT, AND TEST INPUT SAME AS SHOWN FOR CHANNEL D MONITOR CIRCUIT
6 115V AC SUPPLIED TO FAULT ALARMS FOR CHANNELS C,A,B, E,J,H,G AND F MONITOR CIRCUITS SAME AS SHOWN FOR CHANNEL D
CHANNEL D MONITOR CIRCUIT
115V AC SUPPLY
AREA OVHT SIGNAL
DIST ENABLE
+28V DC SUPPLY
DISTANCE SIGNAL
DISTANCE TRANSFER
TEST
FAULT ALARM
TEST RELAY
INTERLOCK RELAYS
DISTANCE TRANSFER
CHANNEL C MONITOR CIRCUIT
AREA OVERHEAT SIGNAL
DISTANCE TRANSFER SIGNAL
CHANNEL A MONITOR CIRCUIT
CHANNEL B MONITOR CIRCUIT
CHANNEL E MONITOR CIRCUIT
CHANNEL J MONITOR CIRCUIT
CHANNEL H MONITOR CIRCUIT
CHANNEL G MONITOR CIRCUIT
CHANNEL F MONITOR CIRCUIT
(CIRCUIT SAME AS CHANNEL D)
SAME AS CHANNEL D
END
START
DC GND
LOOP A
LOOP B
CHANNEL C
CHANNEL A
CHANNEL B
CHANNEL E
CHANNEL J
CHANNEL H
CHANNEL G
CHANNEL F
AFT CARGO COMPARTMENT HEAT EXCHANGER TEMP SWITCHES
-812
-98
163-1550
CENTER CARGO COMPARTMENT HEAT EXCHANGER TEMP SWITCHES
-811
-87
154-1505

Fuselage and Wing Area Overheat System Electrical Schematic
SCHEM 1 (Sheet 3)



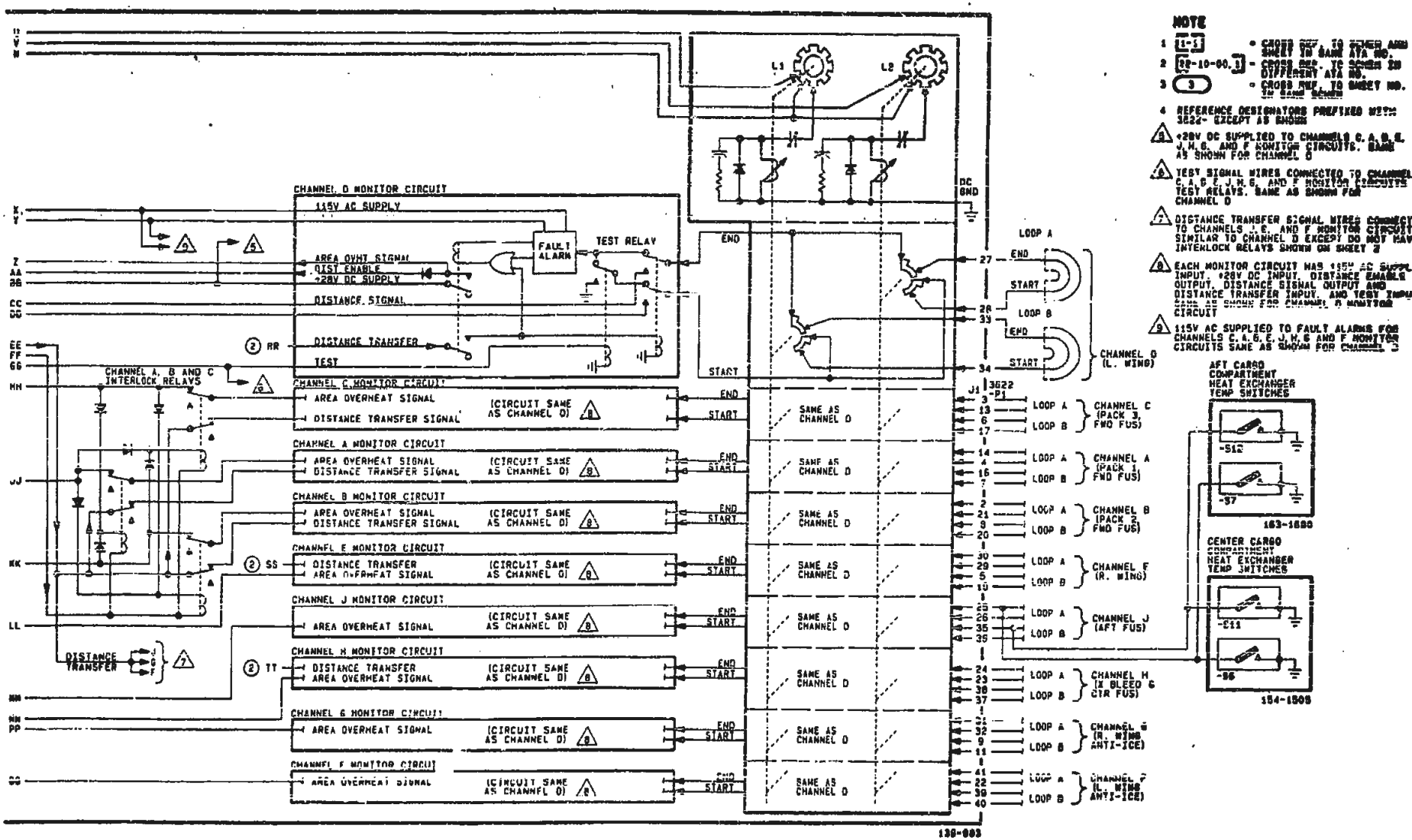
Fuselage and Wing Area Overheat System Electrical Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: 034-999
R
0018



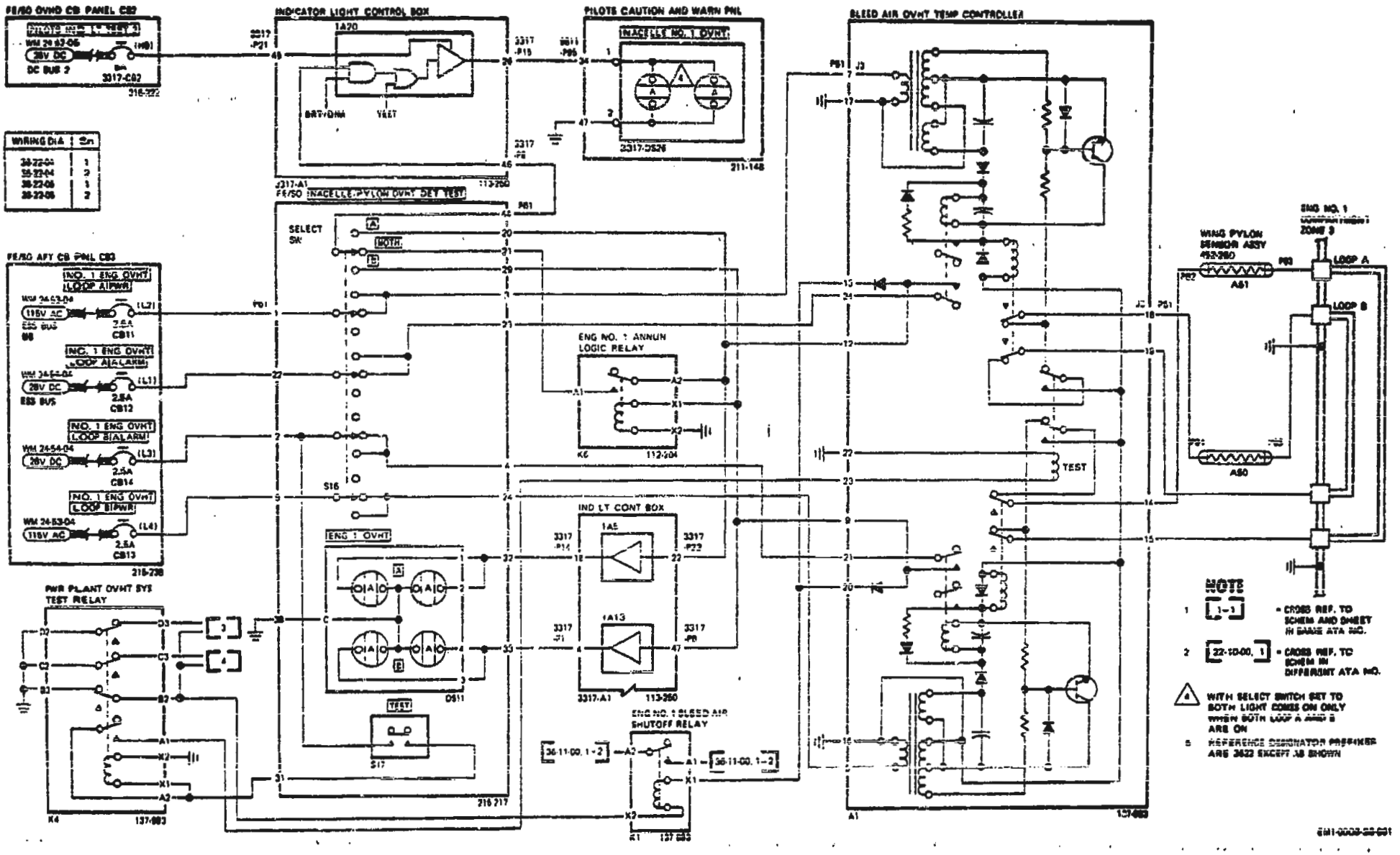
R Fuselage and Wing Area Overheat System Electrical Schematic
R SCHEM 1 (Sheet 2)

EFFECTIVITY: 034-999


CHANNEL D MONITOR CIRCUIT
115V AC SUPPLY
AREA OVHT SIGNAL
DIST ENABLE
+28V DC SUPPLY
DISTANCE SIGNAL
DISTANCE TRANSFER
TEST
FAULT ALARM
TEST RELAY
CHANNEL A, B AND C INTERLOCK RELAYS
CHANNEL C MONITOR CIRCUIT
AREA OVERHEAT SIGNAL
DISTANCE TRANSFER SIGNAL
(CIRCUIT SAME AS CHANNEL D)
CHANNEL A MONITOR CIRCUIT
CHANNEL B MONITOR CIRCUIT
CHANNEL E MONITOR CIRCUIT
CHANNEL J MONITOR CIRCUIT
CHANNEL H MONITOR CIRCUIT
CHANNEL G MONITOR CIRCUIT
CHANNEL F MONITOR CIRCUIT
SAME AS CHANNEL D
DISTANCE TRANSFER
DC GND
LOOP A
LOOP B
CHANNEL D (L. WING)
CHANNEL C (PACK 3, FWD FUS)
CHANNEL A (PACK 1, FWD FUS)
CHANNEL B (PACK 2, FWD FUS)
CHANNEL F (R. WING)
CHANNEL J (AFT FUS)
CHANNEL H (X BLEED & CTR FUS)
CHANNEL G (R. WING ANTI-ICE)
CHANNEL F (L. WING ANTI-ICE)
AFT CARGO COMPARTMENT HEAT EXCHANGER TEMP SWITCHES
CENTER CARGO COMPARTMENT HEAT EXCHANGER TEMP SWITCHES
NOTE
4 REFERENCE DESIGNATORS PREFIXED WITH 3622- EXCEPT AS SHOWN
5 +28V DC SUPPLIED TO CHANNELS C, A, B, E, J, H, G, AND F MONITOR CIRCUITS, SAME AS SHOWN FOR CHANNEL D
6 TEST SIGNAL WIRES CONNECTED TO CHANNELS C, A, B, E, J, H, G, AND F MONITOR CIRCUITS TEST RELAYS, SAME AS SHOWN FOR CHANNEL D
7 DISTANCE TRANSFER SIGNAL WIRES CONNECTED TO CHANNELS J, E, AND F MONITOR CIRCUITS SIMILAR TO CHANNEL D EXCEPT DO NOT HAVE INTERLOCK RELAYS SHOWN ON SHEET 2
8 EACH MONITOR CIRCUIT HAS 115V AC SUPPLY INPUT, +28V DC INPUT, DISTANCE ENABLE OUTPUT, DISTANCE SIGNAL OUTPUT AND DISTANCE TRANSFER INPUT, AND TEST INPUT SAME AS SHOWN FOR CHANNEL D MONITOR CIRCUIT
9 115V AC SUPPLIED TO FAULT ALARMS FOR CHANNELS C, A, B, E, J, H, G AND F MONITOR CIRCUITS SAME AS SHOWN FOR CHANNEL D

R Fuselage and Wing Area Overheat System Electrical Schematic
R SCHEM 1 (Sheet 3)

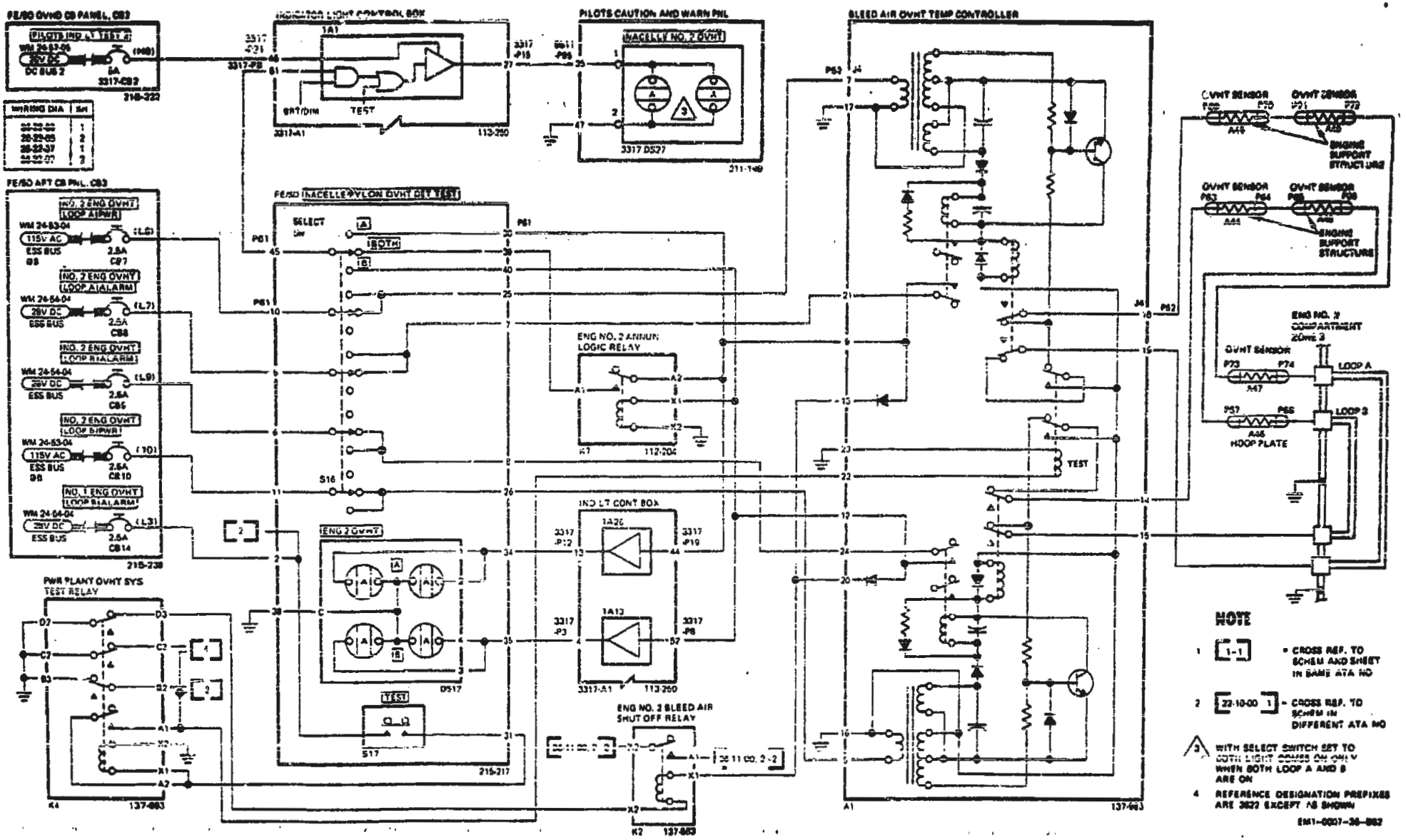
EFFECTIVITY: 034-999


FE/SO OVHD CB PANEL C82
INDICATOR LIGHT CONTROL BOX
PILOTS CAUTION AND WARN PNL
BLEED AIR OVHT TEMP CONTROLLER
FE/SO AFT CB PNL C83
FE/SO NACELLE/PYLON OVHT DET TEST
SELECT SW
ENG NO. 1 ANNUN LOGIC RELAY
IND LT CONT BOX
ENG 1 OVHT
PWR PLANT OVHT SYS TEST RELAY
ENG NO. 1 BLEED AIR SHUTOFF RELAY
WING PYLON SENSOR ASSY
ENG NO. 1 ZONE 3
LOOP A
LOOP B
TEST
NOTE
WITH SELECT SWITCH SET TO BOTH LIGHT COMES ON ONLY WHEN BOTH LOOP A AND B ARE ON
REFERENCE DESIGNATOR PREFIXES ARE 3622 EXCEPT AS SHOWN

R Engine No. 1 Nacelle/Pylon Area Overheat System Schematic
R SCHEM 2

EFFECTIVITY: ALL

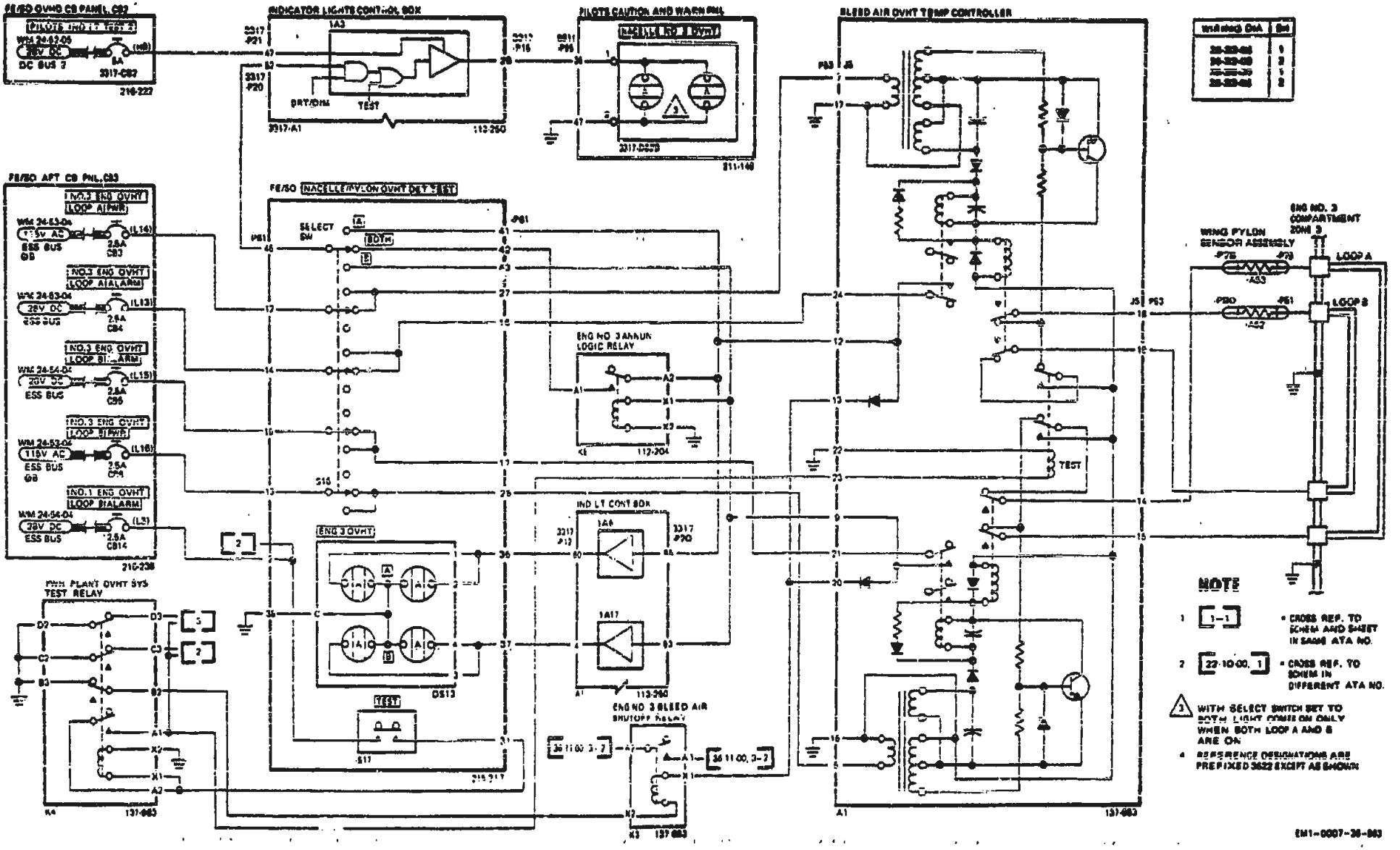
0018


FE/SO OVHT CB PANEL, CB3
FE/SO AFT CB PNL, CB3
FE/SO NACELLE/PYLON OVHT DET TEST
INDICATOR LIGHT CONTROL BOX
PILOTS CAUTION AND WARN PNL
BLEED AIR OVHT TEMP CONTROLLER
ENG NO. 2 ANNUN LOGIC RELAY
IND LT CONT BOX
ENG 2 OVHT
PWR PLANT OVHT SYS TEST RELAY
ENG NO. 2 BLEED AIR SHUT OFF RELAY
OVHT SENSOR
ENGINE SUPPORT STRUCTURE
ENG NO. 2 COMPARTMENT ZONE 3
LOOP A
LOOP B
HOOP PLATE
TEST
SELECT
BOTH
NACELLE NO. 2 OVHT
NOTE
1 [1-1] - CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO
2 [22-10-00 1] - CROSS REF. TO SCHEM IN DIFFERENT ATA NO
3 WITH SELECT SWITCH SET TO BOTH, LIGHT COMES ON ONLY WHEN BOTH LOOP A AND B ARE ON
4 REFERENCE DESIGNATION PREFIXES ARE 3822 EXCEPT AS SHOWN

R Engine No. 2 Nacelle/Pylon Area Overheat System Schematic
R SCHEM 3

EFFECTIVITY: ALL

0018


FE/EO OVHD CB PANEL C82
INDICATOR LIGHTS CONTROL BOX
PILOTS CAUTION AND WARN PNL
BLEED AIR OVHT TEMP CONTROLLER
FE/EO APT CB PNL C83
FE/EO NACELLE/PYLON OVHT DET SYST
ENG NO 3 HARNESS LOGIC RELAY
IND LT CONT BOX
ENG 3 OVHT
PWR PLANT OVHT SYS TEST RELAY
ENG NO 3 BLEED AIR SHUTOFF RELAY
WING PYLON SENSOR ASSEMBLY
ENG NO. 3 COMPARTMENT ZONE 3
LOOP A
LOOP B
SELECT SW
BOTH
TEST
NOTES
1 [1-1] * CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2 [22-10-00, 1] * CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3 WITH SELECT SWITCH SET TO BOTH LIGHT COMES ON ONLY WHEN BOTH LOOP A AND B ARE ON
4 REFERENCE DESIGNATIONS ARE PREFIXED 3622 EXCEPT AS SHOWN

R Engine No. 3 Nacelle/Pylon Area Overheat System Schematic
R SCHEM 4

EFFECTIVITY: ALL

001B

BLEED AIR OVERHEAT WARNING SYSTEM - ADJUSTMENT AND TEST

1. General

The bleed air area overheat warning system includes built-in test equipment (BITE). The BITE system consists of circuit continuity checks and simulated overheat conditions to test the area overheat detection controller and all overheat sensors except the five thermal switches in the forward, center and aft cargo compartment heat exchangers. The following procedures include BITE system operation, a functional test procedure to actuate the cargo compartment heat exchanger thermal switches, and a procedure to adjust the area overheat controller after replacing a sensor element.

The bleed air and air conditioning systems should not be in operation during the functional test portion of this procedure, or when adjusting the area overheat controller after replacing a sensor element.

2. Equipment and Materials

Heat gun, Raychem Corp, PN 500A, or equivalent

Standard ac resistance bridge or WV98B Vacuum Tube Voltmeter, RCA, Harrison, New Jersey, 07029

3. Referenced Procedures

23-43-00	Service Interphone System - Adjustment and Test
24-00-00	Electrical Power System - Maintenance Practices
36-22-00	Bleed Air Overheat Warning System - Fault Isolation
36-22-02	Area Overheat Sensors - Removal and Installation
36-22-20	Forward Cargo Compartment Heat Exchanger Thermal Switch - Removal and Installation
36-22-21	Center Cargo Compartment Heat Exchanger Thermal Switch - Removal and Installation
36-22-22	Aft Cargo Compartment Heat Exchanger Thermal Switch - Removal and Installation

4. Adjustment/Test

A. Operational Test - BITE System

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel, CB3, verify that the following circuit breakers are closed:

DUCT AREA OVHT DET

DC (W13)

AC (W14)

ENG NO. 1

ENG OVHT

LOOP A

ALARM (L1)

POWER (L2)

LOOP B

ALARM (L3)

POWER (L4)

ENG NO. 2

ENG OVHT

LOOP A

ALARM (L7)

POWER (L8)

LOOP B

ALARM (L9)

POWER (L10)

ENG NO. 3

ENG OVHT

LOOP A

ALARM (L13)

POWER (L14)

LOOP B

ALARM (L15)

POWER (L16)

(3) Perform test of fuselage and wing area subsystems as follows:

(a) On Flight Engineer/Second Officers ENGINE BLEED CONTROL/CABIN TEMP CONTROL panel, depress three PACK FLOW CONTROL switchlights (for systems 1, 2, and 3) to the normal on position (Ref. Fig. 501)

(b) Set AREA OVHT selector switch to BOTH position.

(c) Depress and hold TEST switch (below the selector switch). Verify that all seven AREA OVHT lights come on (channels A, B, C, D, E, H and J). On pilots overheat WING ANTI-ICE panel, verify that the two DUCT FAIL lights come on (channels F and G). On pilots center instrument panel, caution and warning annunciator panel, verify that AREA/DUCT OVERHEAT light flashes on and off for 10 seconds, then remains on.

(d) With TEST switch still depressed, momentarily depress annunciator RESET switch on pilots center instrument panel. Verify that AREA/DUCT OVERHEAT light goes off and that the seven AREA OVHT lights and the two DUCT FAIL lights remain on.

(e) Release TEST switch. Verify that seven AREA OVHT lights and the two DUCT FAIL lights go off.

(f) Set AREA OVHT selector switch to A position.

(g) Repeat Steps 4A(3)(a) through 4A(3)(e).

(h) Set AREA OVHT selector switch to B position.

(j) Repeat Steps 4A(3)(a) through 4A(3)(e).

(k) Set AREA OVHT selector switch to BOTH position.

(l) Return PACK FLOW CONTROL switchlights to the pre-test position.

(4) Perform test of nacelle/pylon area subsystems as follows:

(a) On Flight Engineer/Second Officers NACELLE/PYLON OVHT DET TEST panel, set ENG 1, ENG 2, and ENG 3 selector switches to BOTH position (Ref. Fig. 501).

(b) Depress and hold TEST switch. Verify that ENG 1, ENG 2, and ENG 3 - A and B lights come on (3 places). On pilots center instrument panel, caution and warning annunciator panel, verify that NACELLE NO. 1 OVHT, NACELLE NO. 2 OVHT, and NACELLE NO. 3 OVHT lights flash on and off for 10 seconds, then remain on.

(c) Still depressing TEST switch, momentarily depress annunciator RESET switch on the pilots center instrument panel. Verify that NACELLE NO. 1 OVHT, NACELLE NO. 2 OVHT, and NACELLE NO. 3 OVHT lights go off, and that ENG 1, ENG 2, and ENG 3 - A and B lights on the Flight Engineer/Second Officers NACELLE/PYLON OVHT DET TEST panel remain on.

(d) Release TEST switch. Verify that ENG 1, ENG 2, and ENG 3 - A and B overheat lights go off.

(e) Set ENG 1, ENG 2, and ENG 3 selector switches to A position.

(f) Repeat Steps 4A(4)(b) through 4A(4)(d). Verify that only the three A lights come on.

(g) Set ENG 1, ENG 2, and ENG 3 selector switches to B position.

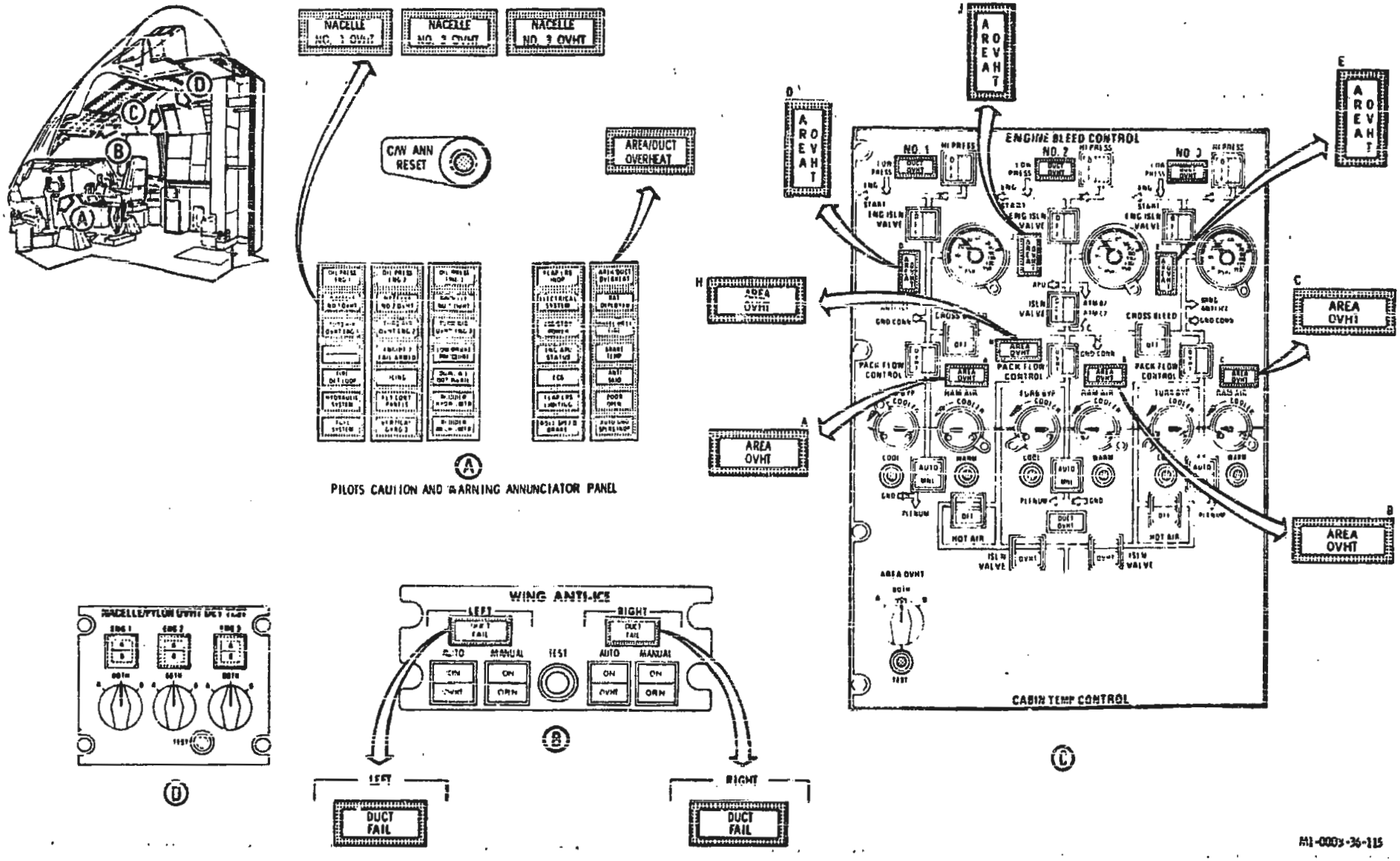
(h) Repeat Steps 4A(4)(b) through 4A(4)(d). Verify that only the three B lights come on.

(j) Return ENG 1, ENG 2, and ENG 3 selector switch to BOTH position.

(5) Turn off electrical power (Ref. 24-00-00).

B. Functional Test - Cargo Compartment Heat Exchanger Thermal Switches

(1) Turn on electrical power (Ref. 24-00-00).



PILOTS CAUTION AND WARNING ANNUNCIATOR PANEL

M1-0003-36-115

R Control Panels – Bleed Air Area Overheat System Test
R Figure 501

EFFECTIVITY: ALL

0018

(2) On Flight Engineer/Second Officers aft circuit breaker panel, CB3, verify that the following circuit breakers are closed:

DUCT AREA OVHT DET

DC (W13)

AC (W14)

WARNING: USE PROPER SAFETY PROCEDURES TO PROTECT PERSONNEL AGAINST HEAT GUN DISCHARGE.

CAUTION: WRAP WIRING HARNESS AND CONNECTOR END OF THERMAL SWITCH WITH HEAT RESISTANT MATERIAL. DO NOT ALLOW HEAT GUN DISCHARGE TO BLOW UPON ANY COMPONENT OTHER THAN SENSING PROBE OF THERMAL SWITCH.

(3) On the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, set AREA OVHT selector switch to BOTH position.

(4) Remove either of the two aft cargo compartment heat exchanger thermal switches (Ref. 36-22-22).

(5) Reconnect the electrical connector to the stud of the removed thermal switch and ground wire to the ground stud.

(6) Turn on heat gun and direct full flow on the sensing probe. Maintain the heat flow until the following is observed:

On the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel, verify that AREA OVHT light, channel "J", adjacent to the No. 2 ENG ISLN VALVE switchlight, comes on when the heated thermal switch actuates.

On the pilots center instrument panel, caution and warning panel, verify that AREA/DUCT OVERHEAT light flashes on and off for 10 seconds, then remains on.

(7) Momentarily depress the annunciator RESET switch on the pilots center instrument panel. Verify that the AREA/DUCT OVERHEAT light goes off, but that the AREA OVHT light on the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel remains on.

(8) On ENGINE BLEED CONTROL panel, set AREA OVHT selector switch to A and B positions. The AREA OVHT light must be on at only one of these two positions.

(9) Return AREA OVHT selector switch to BOTH. Verify that AREA OVHT light is on.

(10) Turn off the heat gun and allow the thermal switch to cool. When the thermal switch has cooled, verify that the AREA OVHT light goes off.

(11) In the mid electrical service center, reset the counter and depress the RESET switch on the overheat controller.

(12) Reinstall the first thermal switch and remove the second thermal switch (Ref. 36-22-22).

(13) Repeat Steps 4B(5) through 4B(11).

(14) Reinstall the second aft cargo compartment heat exchanger thermal switch (Ref. 36-22-22).

(15) Remove either of the two center cargo compartment heat exchanger thermal switches (Ref. 36-22-21).

(16) Repeat Steps 4B(5) through 4B(11).

(17) Reinstall the first thermal switch, and then remove the second thermal switch.

(18) Repeat Steps 4B(5) through 4B(11).

(19) Reinstall the second center cargo compartment heat exchanger thermal switch (Ref. 36-22-21).

(20) Remove forward cargo compartment heat exchanger thermal switch (Ref. 36-22-20).

(21) Reconnect the thermal switch to the electrical connector.

(22) Turn on heat gun and direct the full flow on the sensing probe. Maintain the heat flow until the following is observed:

At the Flight Engineer/Second Officers station, verify that the three AREA OVHT lights adjacent to the three PACK FLOW CONTROL switchlights identified as A, B, and C, come on when the heated thermal switch actuates.

On the pilots center instrument panel, caution and warning panel, verify that AREA/DUCT OVERHEAT light flashes on and off for 10 seconds, then remains on.

(23) Momentarily depress the annunciator RESET switch on the pilots center instrument panel. Verify that the AREA/DUCT OVERHEAT light goes off, but the three AREA OVHT lights on the ENGINE BLEED CONTROL panel remain on.

(24) Turn off the heat gun and allow the thermal switch to cool. When the thermal switch has cooled, verify that the three AREA OVHT lights go off simultaneously.

(25) Install the forward cargo compartment heat exchanger thermal switch (Ref. 36-22-20).

(26) Return all selectors and switchlights to their pre-test positions.

(27) Turn off electrical power (Ref. 24-00-00).

C. System Calibration After Sensor Replacement

NOTE: Perform this procedure whenever a sensor element has been replaced.

(1) On Flight Engineer/Second Officers aft circuit breaker panel, CB3, open and tag the following circuit breakers:

DUCT AREA OVHT DET

DC (W13)

AC (W14)

(2) At the mid electrical service center, on the overheat controller, disconnect connector 3622-P1 from the controller (Ref. 36-22-00).

CAUTION: USE STANDARD AC RESISTANCE BRIDGE OR WV98B VTVM ONLY TO CHECK SENSOR RESISTANCE.

DO NOT CHECK INSULATION RESISTANCE WHEN ELEMENT IS HEATED TO WITHIN 100 DEGREES OF THE ALARM POINT. ABOVE ROOM TEMPERATURE AND UP TO 100 DEGREES FROM THE SET POINT, LIMIT CHECKING TO 5 SECOND APPLICATIONS NO MORE OFTEN THAN TWICE A MINUTE. BELOW ROOM TEMPERATURE THE TEST INSTRUMENT MAY BE USED WITHOUT RESTRICTIONS. FAILURE TO COMPLY WITH THE ABOVE INSTRUCTIONS MAY RESULT IN PERMANENT DAMAGE TO THE SENSING ELEMENT.

(3) Measure the loop circuit resistance with a standard ac resistance bridge or VTVM.

(4) Compare the calibrated resistance with the resistance listed on the nomograph (Ref. Fig. 502).

(5) If the resistance differential between the new resistance reading and the value on the nomograph is within plus or minus ten percent, then no further action is necessary.

Reconnect the connector 3622-P1 to the overheat controller.

Remove the tags and close circuit breakers opened in Paragraph 4C(1).

(6) If the resistance differential is greater than plus or minus ten percent, then proceed as follows:

(a) Using a standard ac resistance bridge or VTVM, measure the loop resistance at the connector (Ref. Table 501).

NOTE: Subtract the instrument test leads resistance from the measured resistance.

Calibration Work Sheet
Table 501

CH	LOOP	3622-J1 PINS START	3622-J1 PINS END	FORMULA		CORRECTION FACTOR
A	A	4	14	$\frac{5005}{200 + 1.22(*R)}$	+ 25	_____
	B	7	16			
B	A	21	2	$\frac{4732}{200 + 1.22(*R)}$	+ 25	_____
	B	20	8			
C	A	13	3	$\frac{3731}{200 + 1.22(*R)}$	+ 25	_____
	B	17	6			

Calibration Work Sheet (Cont)
Table 501

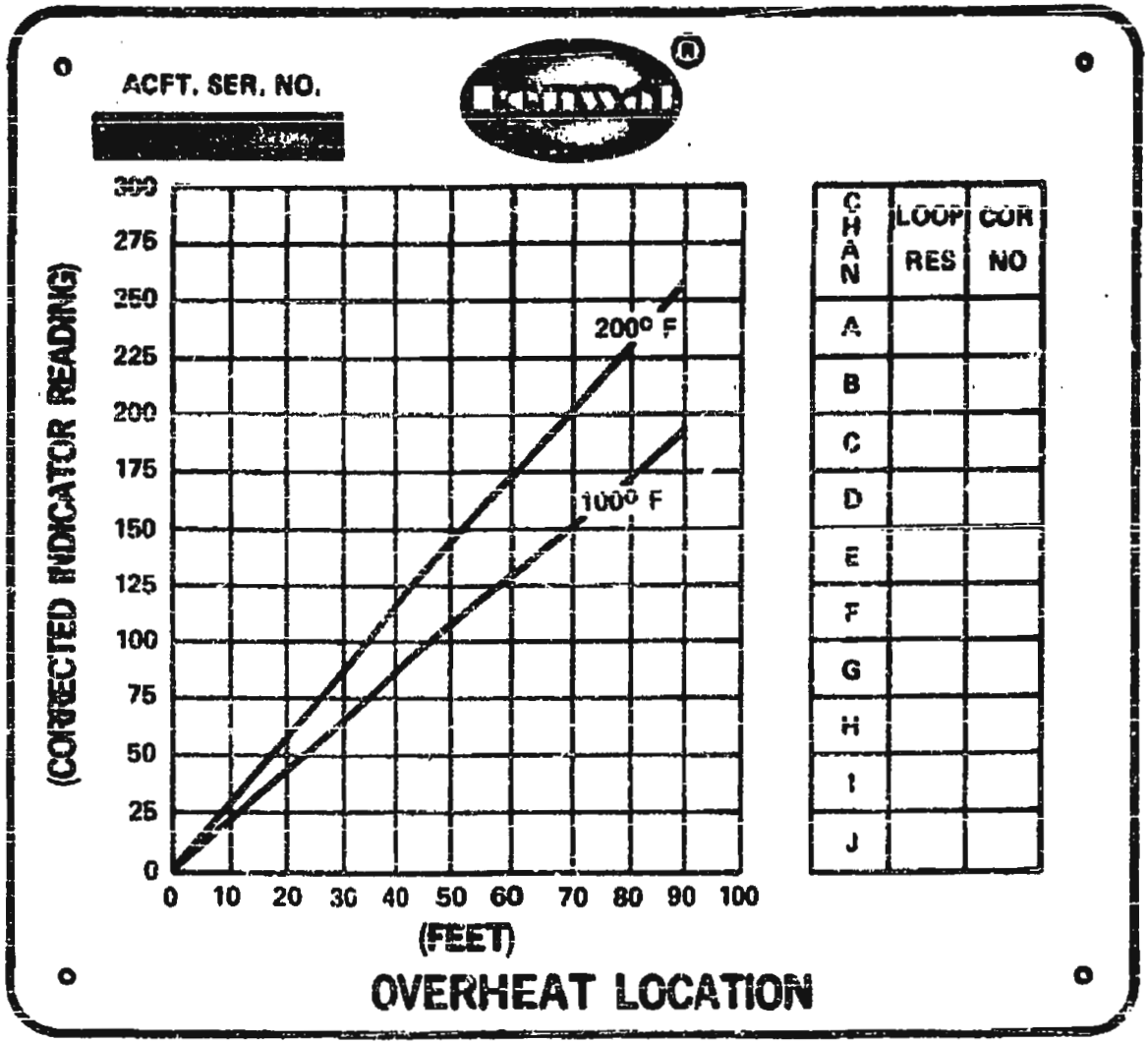
CH	LOOP	3622-J1 PINS START	3622-J1 PINS END	FORMULA		CORRECTION FACTOR
D	A	28	27	4457 / (200 + 1.22(*R))	+ 25	_____
	B	34	33			
E	A	29	30	3367 / (200 + 1.22(*R))	+ 25	_____
	B	15	5			
F	A	22	41	10556 / (200 + 1.22(*R))	+ 25	_____
	B	40	39			
G	A	32	31	11011 / (200 + 1.22(*R))	+ 25	_____
	B	11	9			
H	A	23	24	3731 / (200 + 1.22(*R))	+ 25	_____
	B	37	38			
J	A	26	25	14742 / (200 + 1.22(*R))	+ 25	_____
	B	36	35			

*Enter the calibrated average resistance of loop A and B.

Measure the resistance at the disengaged overheat controller connector.

The resistance will be different for each aircraft.

(b) Impression stamp or electric etch the resistance value in ohms on the nomograph (Ref. Fig. 502).



HOW TO USE NOMOGRAPH

(1) CORRECT THE INDICATOR COUNTER READING ON OVERHEAT CONTROLLER BY SUBTRACTING THE CORRECTION NUMBER OF FAULTED AREA CHANNEL

(2) ENTER LEFT SIDE OF CHART (CORRECTED INDICATOR READING) WITH CORRECTED COUNTER READING AND READ ACROSS TO INTERSECT THE 100°F OR 200°F LINE. USE 100°F LINE IF OVERHEAT OCCURRED INFLIGHT AND THE 200°F IF ON THE GROUND ON A HOT DAY

(3) FROM THE 100°F OR 200°F LINE (AS APPLICABLE) DROP DOWN VERTICALLY TO BASE LINE AND READ DISTANCE IN FEET. DISTANCE IS MEASURED FROM THE END OF SENSOR NEAREST TO CONTROLLER

M1-0005-36-194

Area Overheat Fault Location Nomograph
Figure 502

(c) Calibrate the correction factor by using the formula listed in Table 501 for the affected channel and loop.

(d) Impression stamp or electric etch the correction factor on the nomograph.

(e) Turn on electrical power (Ref. 24-00-00).

(f) Remove tags and close circuit breakers that were opened in Paragraph 4C(1).

(g) Gain access to a point along the sensor element. The distance between this point and the start end of the sensors must be known to conduct this validation. Refer to 36-22-02 removal and installation procedures for the sensor location and access.

R

WARNING: USE PROPER SAFETY PROCEDURES TO PROTECT PERSONNEL AGAINST HEAT GUN DISCHARGE.

CAUTION: USE A HEAT RESISTANT SHIELD AROUND OR IN FRONT OF AIRCRAFT COMPONENTS TO PREVENT HEAT GUN DISCHARGE DAMAGE. THE HEAT GUN DISCHARGE FLOW MUST BE DIRECTED ON THE SENSOR ELEMENT ONLY AS LONG AS NECESSARY TO COMPLETE THE CALIBRATION.

(h) Turn on the heat gun and direct the flow on the selected point of the sensor element. Apply only enough heat to complete the counter operation at the overheat controller.

(j) Turn off the heat gun.

(k) Observe the digital reading on the overheat controller counter, then subtract the correction factor.

Verify that the overheat location determined from the nomograph is within ten percent of the distance between the applied heat on the sensor element and the start connector (Ref. Table 502).

NOTE: If the system was selected to operate only on one loop, then the counter will indicate twice the distance. This is corrected by halving the counter reading before subtracting the correction factor.

Sensor Start and End Locations (Approximate)
Table 502

CHANNEL/ LOOP	START			END		
	STA	WL	BL	STA	WL	BL
A/A	FS963	115	21L	FS378	131	50L
A/B	FS963	115	21L	FS378	131	50L
B/A	FS963	115	0	FS378	137	61R
B/B	FS963	115	0	FS378	137	61R
C/A	FS943	115	21R	FS378	161	83R
C/B	FS943	115	21R	FS378	161	83R
D/A	FS963	109	21L	WS350	-	-
R D/B	FS963	109	21L	WS350	-	-
E/A	FS963	109	21R	WS350	-	-
E/B	FS963	109	21R	WS350	-	-
F/A	WS430	-	-	WS360	-	-
F/B	WS360	-	-	WS430	-	-
G/A	WS360	-	-	WS430	-	-
G/B	WS360	-	-	WS430	-	-
H/A	FS975	110	0	FS1408	120	89R
H/B	FS975	110	0	FS1408	120	89R
J/A	FS1343	110	36L	FS2060	350	15L
J/B	FS1343	110	36L	FS2060	350	15L

Verify that the affected channel AREA OVHT light on the ENGINE BLEED CONTROL panel at the Flight Engineer/Second Officers station, or the DUCT FAIL light on the WING ANTI-ICE panel on the pilots overhead panel comes on.

On the pilots center instrument panel, caution and warning panel, verify that AREA/DUCT OVERHEAT light flashes on and off for 10 seconds, then remains on.

(l) Momentarily depress the annunciator or RESET switch on the pilots center instrument panel. Verify that the AREA/DUCT OVERHEAT light goes off, but that the AREA OVHT light on the Flight Engineer/Second Officers ENGINE BLEED CONTROL panel or the DUCT FAIL light on the WING ANTI-ICE panel on the pilots overhead panel remains on.

NOTE: All of the mentioned lights will go off when the sensor element has cooled sufficiently to resume its normal characteristics.

(m) When the sensor cools, the lights should go off.

(n) Turn off the electrical power (Ref. 24-00-00). Reset the counter and operate the RESET switch on the overheat controller.

BLEED AIR AREA OVERHEAT CONTROLLER - REMOVAL AND INSTALLATION

1. General

The bleed air area overheat controller is located in the mid electrical service center, zone 137. If fault has been isolated to a component board, refer to Paragraph 3.

2. Referenced Procedure

36-22-00 Bleed Air Area Overheat Warning System - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag the following circuit breakers:

DUCT AREA OVHT DET - DC (W13) and AC (W14)

ENG NO. 1 - ENG OVHT:

LOOP A - ALARM (L1) and PWR (L2)

LOOP B - ALARM (L3) and PWR (L4)

ENG NO. 2 - ENG OVHT:

LOOP A- ALARM (L7) and PWR (L8)

LOOP B - ALARM (L9) and PWR (L10)

ENG NO. 3 - ENG OVHT:

LOOP A- ALARM (L13) and PWR (L14)

LOOP B - ALARM (L15) and PWR (L16)

(2) Open access doors 192K and 137AZ.

(3) Disconnect five electrical connectors from area overheat controller on aft wall (Ref. Fig. 401).

(4) Remove bolts securing overheat controller to mount.

(5) Remove overheat controller.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Install overheat controller on mount on aft wall of mid electrical service center, and secure with bolts (Ref. Fig. 401).

(3) Connect five electrical connectors.

(4) Remove tags and close circuit breakers opened in Step 2A(1).

(5) Close access doors opened in Step 3A(2).

(6) Test bleed air area overheat warning system (Ref. 36-22-00).

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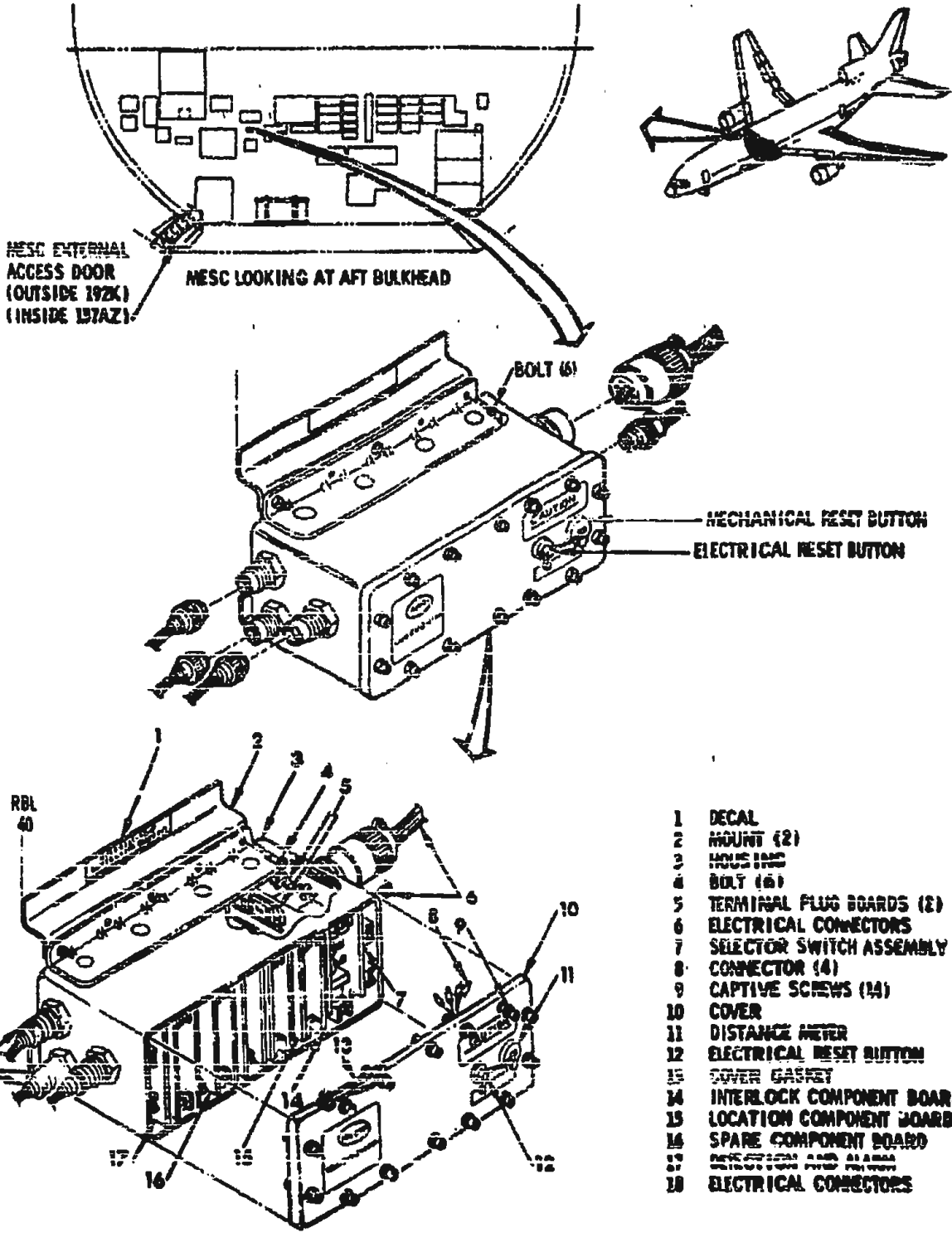
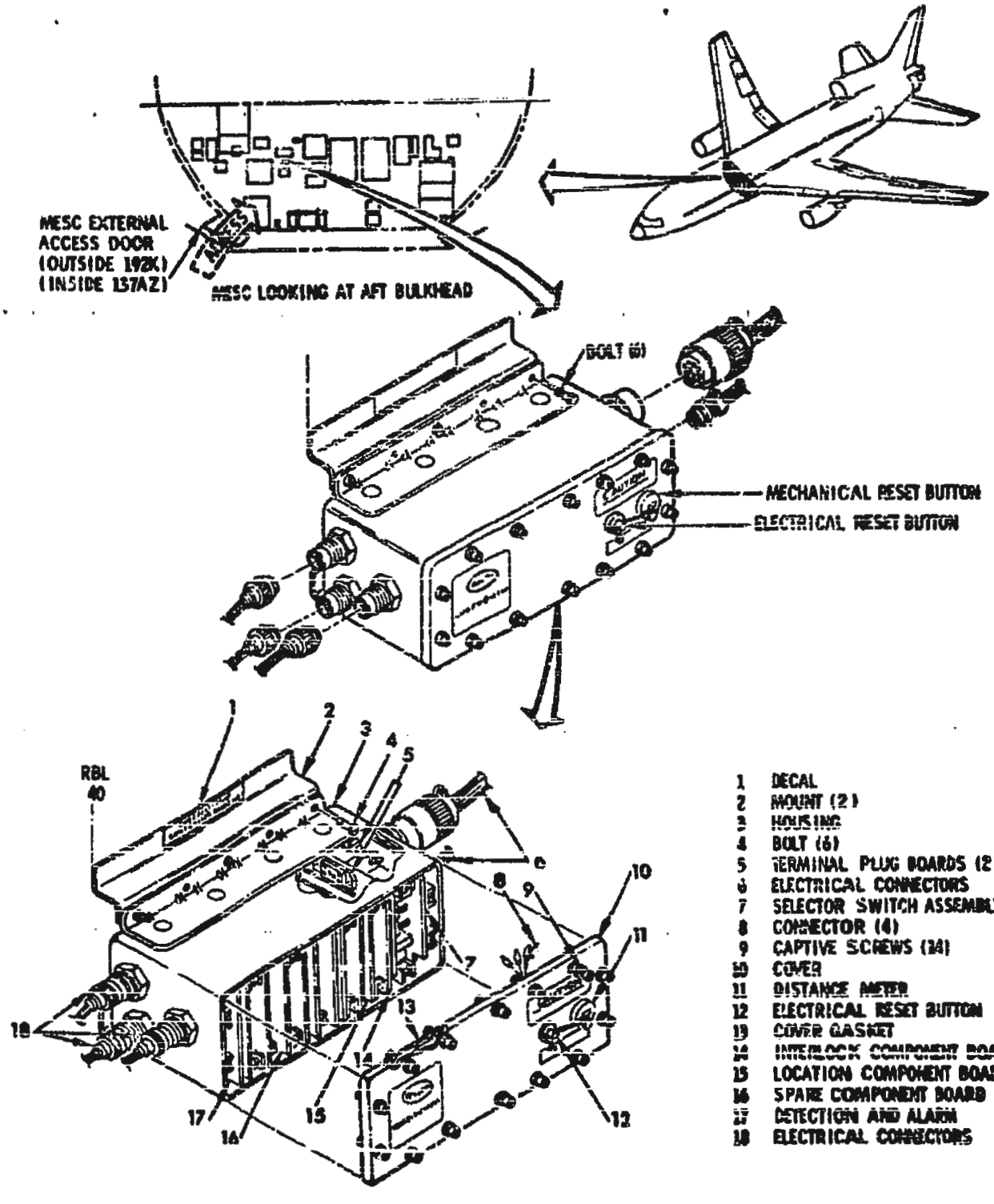


Area Overheat Controller and Components - Removal and Installation
Figure 401



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Area Overheat Controller and Components - Removal and Installation
Figure 401

R Area Overheat Sensors - Removal and Installation

R 1. General

R The The following figures and tables provide general view of
R overheat sensor location, access panels, and installation
R information for all bleed air area overheat warning systems.

R Locate overheat area (Ref. Fig. 401) then refer to Table 401
R which provides detailed location data for each sensor; loop,
R begining and ending station, part number, length, effectivity
R and access panels.

R Figure 401 Area Overheat Sensors Channels Locations

R Figure 402 Area Overheat Sensors Installation Guide

R Table 401 Area Overheat Sensors

R Observe the following conditions when removing or installing
R sensor elements (Ref. Fig. 402):

R CAUTION: THE SENSING ELEMENTS ARE SENSITIVE ELECTRICAL
R COMPONENTS, THEREFORE, THE ELEMENT MUST BE HANDLED
R WITH CARE. NEW ELEMENTS ARE SHIPPED IN COILS
R WHICH MUST BE RESHAPED TO FIT IN THE SPECIFIED
R AREA IN THE WING. WHEN RESHAPING AN ELEMENT,
R AVOID TWISTING, KINKING OR EXCESSIVE BENDING.

R All sensor elements are identified by Lockheed part No.
R 740969-XXX on each element.

R When tightening connectors, apply 50-60 lb in. torque.

R Use protective caps on connectors until ready to mate
R connectors.

R The area of removal or installation work must be clean.

R Minimum bend radius of an element is one inch. The optimum
R is three inches.

R There must be a one inch minimum clearance between sensor
R element and exterior surfaces of duct insulation and
R insulation clamps.

R A structure supported element must not be installed with
R more than 20 inches of unsupported length.

R An element must be supported at the beginning and end of
R each bend.

R There must be a minimum of 0.50-inch straight length in the
R element between a bend and a support clamp or clip.

R There must be a minimum of one inch straight length in the
R element between a connector and support clamp or clip.

R Distance between a connector and the first support clamp or
R clip must not exceed six inches.

R Minimum clearance between an element and aircraft structure
R must not be less than 0.25 inch.

R Support point protective grommets must be free of cracks or
R other signs of deterioration.

R Protective grommets must be positioned in the center of the
R mounting clamp or clip so that the sensor element cannot
R work out of the grommet through the split and make contact
R with the metal clamp or clip.

R A slack loop in the installed element is acceptable if after
R a light finger flip, the element loop movement dampens out
R immediately.

R 2. Equipment_and_Materials

R Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

R Electrical connector protective caps

R 3. Referenced_Procedures

R	6-40-00	Exterior Access Doors and Removable Panels
P	6-50-00	Interior Access Doors and Removable Panels
R R	25-32-00	Galley Lift System - Adjustment and Test (Channels A, B, and C)
R R	25-51-06	Cargo Compartment Liner Panels - Removal and Installation (Channel J)
R R	25-52-00	Cargo Handling and Stowage Equipment - Removal and Installation (Channels A, B, and C)
R R	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test

53-22-20 Galley Floor Panels - Removal and Installation (Channels A, B, and C)

53-24-01 Forward Cargo Compartment Floor Panels - Removal and Installation (Channels A, B, and C)

4. Removal/Installation

A. Removal

NOTE: Ifnecessary to work under forward cargo compartment floor, remove cargo handling and stowage equipment
R (Ref. 25-52-00).

NOTE: If necessary to work in galley lift shaft, position lift at the passenger compartment level and extend the mechanical stops (Ref. 25-32-00). Tag the control panel in the passenger compartment.

(1) Tag the three external high-pressure ground air connection and APU external control panel underneath fuselage.

(2) Channels A, B and C,
tag engine bleed control panel and APU control panel at Flight Engineer/Second Officers (FE/SO) station.

(3) Channels D, E, F, G, H and J
tag engine bleed control panel, APU control panel, and hydraulic system panel, at FE/SO station.

(4) Channels D, E, F and G
tag flap control handle on pilots center console, in flight station.

(5) Channels D, E, F, G, H and J,
tag hydraulic service panel, in hydraulic service center.

(6) Channel J
install control column lock LAC BA80 in flight station.

(7) On FE/SO aft circuit breaker panel, CB3, open and tag the following circuit breakers:

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

(8) Open or remove access panel or panels indicated in Table 401.

(9) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in Figure 402.

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(10) Remove lock-wire from connectors.

(11) Uncouple connectors and install protective caps.

(12) Open each clamp or clip and separate sensor element from clamp or clip.

(13) Remove protective grommets from sensor element.

(14) Inspect the condition of each grommet to determine whether it can be reused or has to be replaced.

(15) Thread the freed sensor element through and around the aircraft structure and remove.

B. Installation

(1) Make sure that panels and fittings listed in Paragraph 4(A) are tagged and that circuit breakers listed in Step 4A(7) are open and tagged.

(2) Make sure that work area is accessible [Ref. Step 4A(8)].

(3) Observe the general rules for the handling of sensors. These rules are outlined in paragraph 1, and are illustrated in Figure 402.

(4) Thread replacement sensor element through and around the aircraft structure.

(5) Remove protective caps and mate connectors at each end of the sensor element, then tighten. Apply lock-wire to connectors.

(6) Place protective grommets on sensor element and position encased portions of the element in the clamp or clip.

(7) Close clamp or clip around the grommet, then tighten.

(8) Remove tags and close circuit breakers opened in Step 4A(7).

(9) Channels A, B, C and H,
remove tags from panels and fittings listed in Paragraph 4(A).

(9) Channels D, E, F and G,
remove tags from all panels except the HYDRAULIC SYSTEM panel in the flight station and the HYDRAULIC SERVICE PANEL in the hydraulic service center.

(9) Channel J,
remove tags from all panels and the three external high-pressure ground air connections.

(10) Channels A, B, C, H and J,
perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

(10) Channels D, E, F and G,
remove tags from the three external high-pressure ground air connections underneath the fuselage.

(11) Channels A, B, C, H and J,
close or install access panel or panels and fasten.

(11) Channels D, E, F and G,
perform a system test as outlined in 36-22-00, Bleed Air Overheat Warning System - Adjustment and Test.

(12) Channels A, B and C,
if work was performed under forward cargo compartment floor, reinstall cargo handling and stowage equipment (Ref. 25-52-00).

(12) Channels D, E, F, and G,
close or install access panel or panels and fasten.

(12) Channel J,
remove control column lock LAC 8A80.

(13) Channels A, B, and C,
if work was performed in the galley lift shaft, remove the mechanical stops (Ref. 25-32-00). Remove tag from the control panel in the passenger compartment.

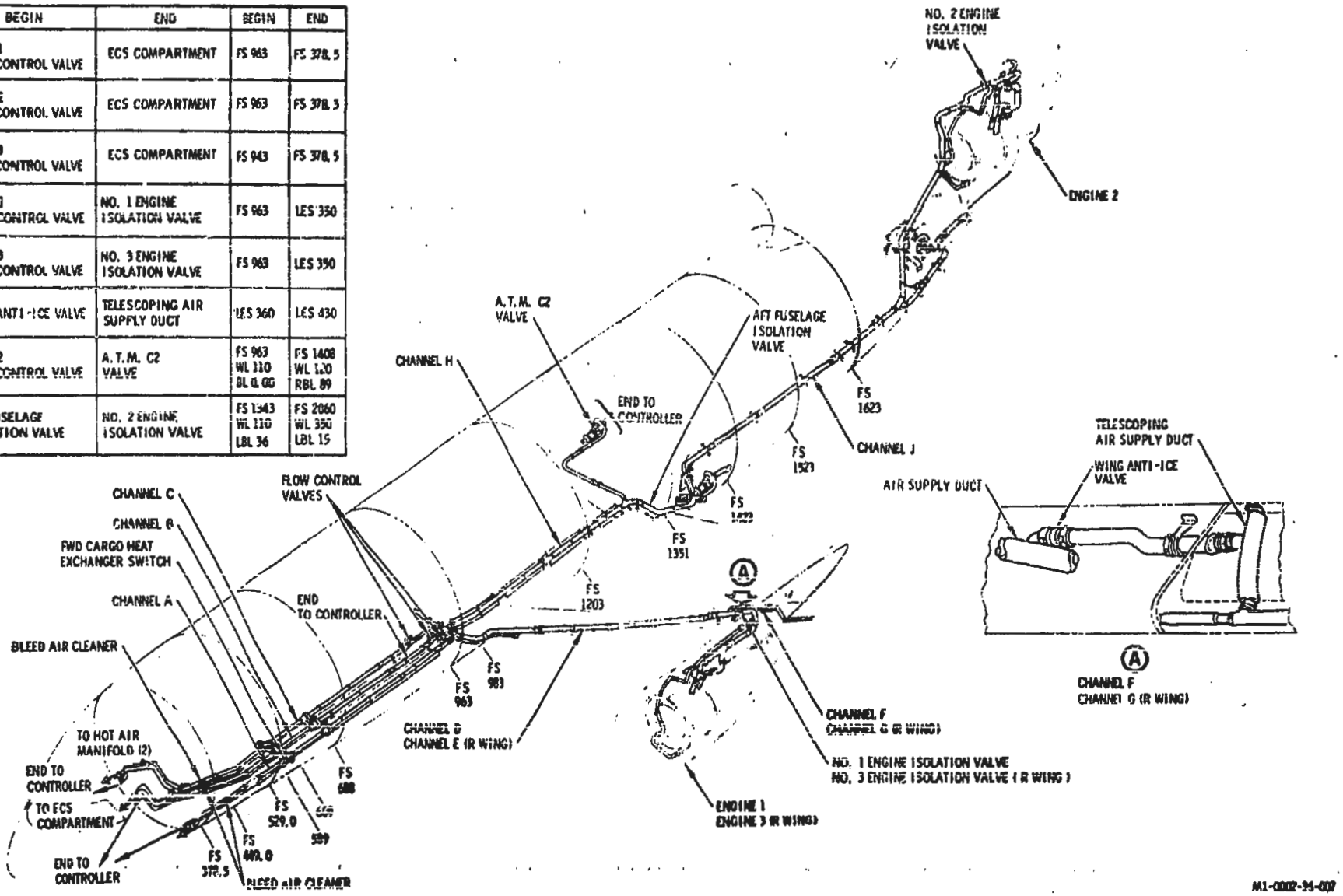
(13) Channels D, E, F and G,
remove tags from the HYDRAULIC SYSTEM panel in the flight station and the HYDRAULIC SERVICE PANEL in the hydraulic service center.

(14) Channels D, E, F and G,
remove tag from the flap control handle on the pilots center console in the flight station.

CR 5. Relocation of Overheat Sensing Element - No. 1 and No. 3 Pylon Area

CR A. To prevent nuisance overheat warnings during engine running on hot days, which could lead to unnecessary troubleshooting and possible flight delays, the overheat sensing elements at the No. 1 and No. 3 engine pylon areas are being relocated to a position behind the electrical heat shield on twenty-four aircraft.

CHANNEL	BEGIN	END	BEGIN	END
A	PACK 1 FLOW CONTROL VALVE	ECS COMPARTMENT	FS 963	FS 378.5
B	PACK 2 FLOW CONTROL VALVE	ECS COMPARTMENT	FS 963	FS 378.5
C	PACK 3 FLOW CONTROL VALVE	ECS COMPARTMENT	FS 963	FS 378.5
D	PACK 1 FLOW CONTROL VALVE	NO. 1 ENGINE ISOLATION VALVE	FS 963	LES 350
E	PACK 3 FLOW CONTROL VALVE	NO. 3 ENGINE ISOLATION VALVE	FS 963	LES 350
F,G	WING ANTI-ICE VALVE	TELESCOPING AIR SUPPLY DUCT	LES 360	LES 430
H	PACK 2 FLOW CONTROL VALVE	A.T.M. C2 VALVE	FS 963 WL 110 BL 0.66	FS 1408 WL 120 RBL 89
J	AFT FUSELAGE ISOLATION VALVE	NO. 2 ENGINE ISOLATION VALVE	FS 1343 WL 110 LBL 36	FS 2060 WL 350 LBL 15



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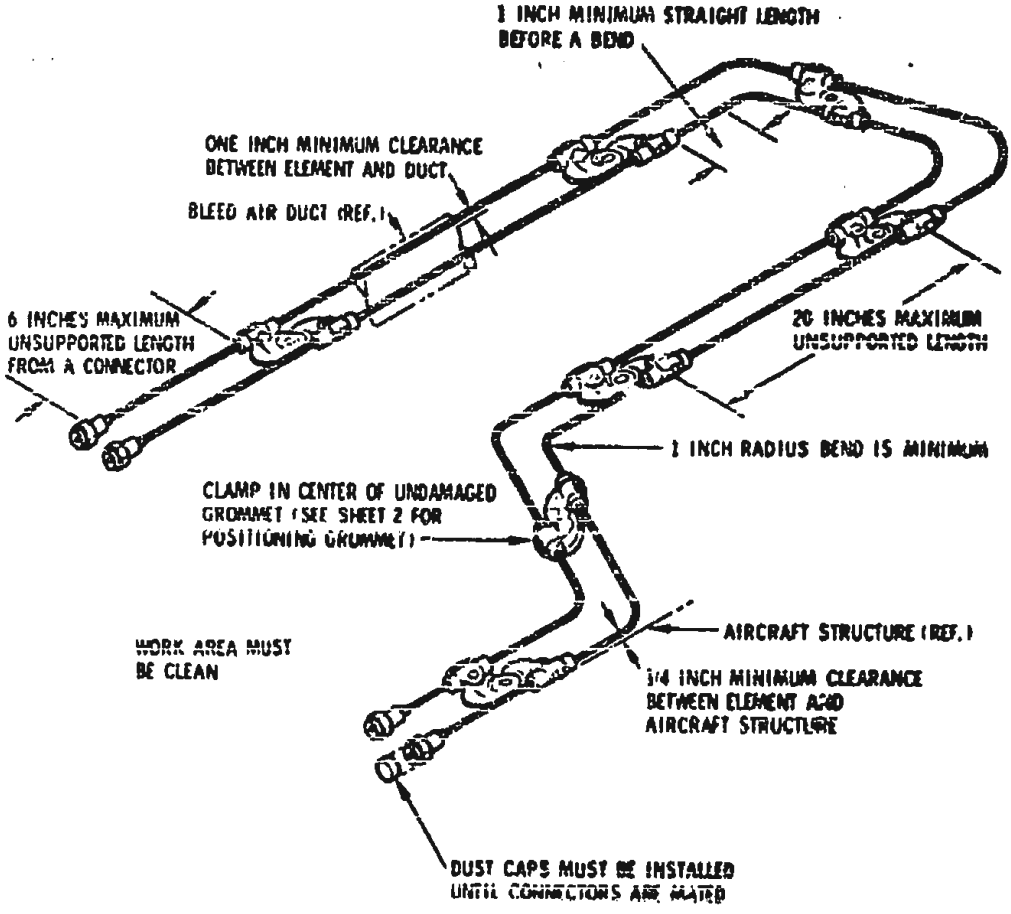
R Area Overheat Sensors Channels Location
R Figure 401

EFFECTIVITY: ALL

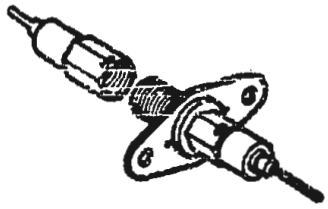

1 INCH MINIMUM STRAIGHT LENGTH BEFORE A BEND
ONE INCH MINIMUM CLEARANCE BETWEEN ELEMENT AND DUCT
BLEED AIR DUCT (REF.)
6 INCHES MAXIMUM UNSUPPORTED LENGTH FROM A CONNECTOR
20 INCHES MAXIMUM UNSUPPORTED LENGTH
1 INCH RADIUS BEND IS MINIMUM
CLAMP IN CENTER OF UNDAMAGED GROMMET (SEE SHEET 2 FOR POSITIONING GROMMET)
WORK AREA MUST BE CLEAN
AIRCRAFT STRUCTURE (REF.)
3/4 INCH MINIMUM CLEARANCE BETWEEN ELEMENT AND AIRCRAFT STRUCTURE
DUST CAPS MUST BE INSTALLED UNTIL CONNECTORS ARE MATED

M1-0101-36-009

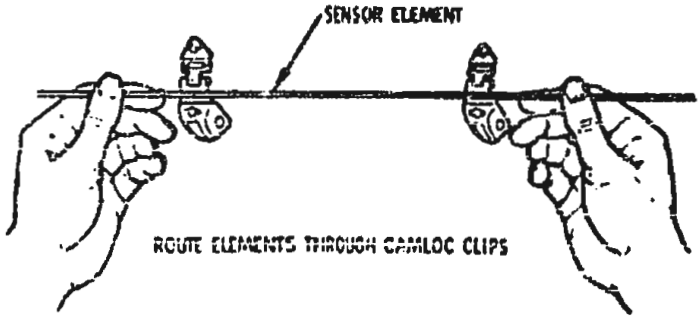
R R Area Overheat Sensors Installation Guide
Figure 402 (Sheet 1)

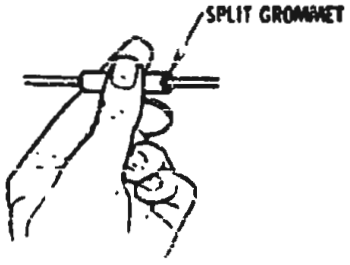
R R 0010 EFFECTIVITY: ALL

INSERT RECEPTACLE CONNECTOR SEAT HEX NUT AND SECURE WITH HEX NUT. TIGHTEN NUT FROM 50-60 LB IN.



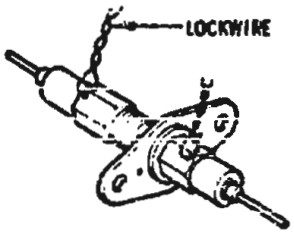
ASSEMBLE PLUG CONNECTOR. DO NOT TWIST SENSOR ELEMENTS.



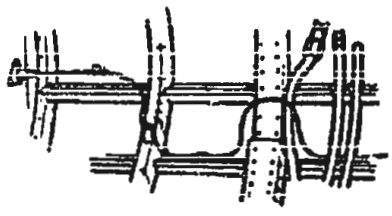


ADD SPLIT GROMMET

POSITION GROMMET ON SENSOR ELEMENT AND INSERT GROMMET INTO CAMLOC CLIP SO THAT ELEMENT WILL NOT WORK ITS WAY THROUGH GROMMET SPLIT TO CONTACT CAMLOC CLIP. CLOSE AND TIGHTEN CAMLOC CLIPS.



TIGHTEN HEX NUTS 50-60 LB IN. AND ATTACH SAFETY WIRE. SENSOR ELEMENTS MUST NOT BE TWISTED.



INSPECT SYSTEM

MI-0100-36-006

R Area Overheat Sensors Installation Guide
R Figure 402 (Sheet 2)

R EFFECTIVITY: ALL
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CHANNEL	LOOP	SEGMENT	BEGIN	END	LOCKHEED PART NO. 740969-XXX	LENGTH INCHES	EFFECTIVITY	ACCESS
A	A, B	6	FS 449	FS 378	-315	102	001-006	117AL, 124AT
A	A, B	5	FS 529	FS 449	-137	90	001-006	124AT, 124BT, 124FT
A	A	4	FS 600	FS 529	-261	76	001-006	124FT, 124HT
A	B	4	FS 600	FS 529	-257	64	001-006	124FT, 124HT
A	A	3	FS 679	FS 600	-323	90	001-006	124HT, 124KT, 124NT
A	B	3	FS 679	FS 600	-289	67	001-006	124HT, 124KT, 124NT
A	A, B	2	FS 846	FS 679	-249	176	001-006	124NT, 124QT, 136AT, 136CT
A	A, B	1	FS 963	FS 846	-155	126	001-006	136CT, LEFT DRIP END, 137HB, 137FB
A	A	5	FS 449	FS 378	-327	94	008-999	117AL, 124AT
A	B	5	FS 449	FS 378	-315	102	008-999	117AL, 124AT
A	A, B	4	FS 519	FS 449	-279	74	008-999	124AT, 124DT
A	A, B	3	FS 674	FS 519	-339	178	008-999	124DT, 124FT, 124HT, 124KT, 124NT, 124QT
A	A, B	2	FS 850	FS 694	-191	162	008-999	124QT, 136AT, 136CT
A	A, B	1	FS 963	FS 850	-275	100	008-031	136CT, LEFT DRIP END, 137HB, 137FB
A	A, B	1	FS 963	FS 850	-273	104	032-999	136CT, LEFT DRIP END, 137HB, 137FB
B	A	7	FS 429	FS 378	-323	90	001-006	118CR
B	B	7	FS 429	FS 378	-319	96	001-006	118CR
B	A	6	FS 449	FS 429	-261	76	001-006	118CR, 124BT
B	B	6	FS 449	FS 429	-259	82	001-006	118CR, 124BT
B	A, B	5	FS 529	FS 449	-137	90	001-006	124BT, 124ET, 124DT
B	A	4	FS 600	FS 529	-261	76	001-006	124GT, 124FT, 124JT, 124HT
B	B	4	FS 600	FS 529	-257	64	001-006	124GT, 124FT, 124JT, 124HT
B	A	3	FS 679	FS 600	-323	90	001-006	124JT, 124HT, 124MT, 124KT, 124PT, 124NT
B	B	3	FS 679	FS 600	-289	67	001-006	124JT, 124HT, 124MT, 124KT, 124PT, 124NT
B	A, B	2	FS 846	FS 679	-249	176	001-006	124NT, 124PT, 124TT, 124RT, 136BT, 136AT, 136DT, 136CT
B	A, B	1	FS 963	FS 846	-155	126	001-006	136DT, 136CT, LEFT AND RIGHT DRIP ENDS, 137JB, 137CB, 137HB, 137FB
B	A, B	6	FS 449	FS 378	-359	124	008-999	118CR, 124BT
B	A, B	5	FS 519	FS 449	-279	74	008-999	124BT, 124ET
B	A, B	4	FS 577	FS 519	-281	66	008-999	124ET, 124GT, 124JT
B	A, B	3	FS 694	FS 619	-337	84	008-999	124MT, 124PT, 124TT
B	A, B	2	FS 850	FS 694	-191	162	008-999	124TT, 136BT, 136DT
B	A, B	1	FS 963	FS 850	-275	100	008-999	136DT, RIGHT DRIP END, 137JB, 137CB
B	A, B	1A	FS 963	FS 950	-215	13	WITH SB21-227	137JB, 137CB 137HB, 137FB
C	A	6	FS 449	FS 378	-107	150	001-006	118CR, 124BT
C	B	6	FS 449	FS 378	-313	132	001-006	118CR, 124BT
C	A, B	5	FS 529	FS 449	-137	90	001-006	124BT, 124ET, 124GT
C	A	4	FS 600	FS 529	-261	76	001-006	124GT, 124JT
C	B	4	FS 600	FS 529	-257	64	001-006	124GT, 124JT
C	A	3	FS 679	FS 600	-323	90	001-006	124JT, 124MT, 124PT
C	B	3	FS 679	FS 600	-289	67	001-006	124JT, 124MT, 124PT
C	A, B	2	FS 846	FS 679	-249	176	001-006	124PT, 124TT, 136BT, 136DT
C	A, B	1	FS 963	FS 846	-273	104	001-006	136DT, RIGHT DRIP END
C	A	5	FS 449	FS 378	-359	124	008-999	118CR, 124BT
C	B	5	FS 449	FS 378	-313	132	008-999	118CR, 124BT
C	A, B	4	FS 519	FS 449	-279	74	008-999	124BT, 124ET
C	A, B	3	FS 679	FS 519	-339	178	008-999	124ET, 124GT, 124JT, 124MT, 124PT
C	A, B	2	FS 839	FS 679	-191	162	008-999	124PT, 124TT, 136BT, 136DT
C	A, B	1	FS 943	FS 839	-273	104	008-999	136DT, RIGHT DRIP END
C	A, B	1	FS 963	FS 943	-215	20	001-083 WITH SB 21-214	137CB

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Area Overheat Sensors
Table 401 (Sheet 1)

EFFECTIVITY: ALL

001B

CHANNEL	LOOP	SEGMENT	BEGIN	END	LOCKHEED PART NO. 740969-XXX	LENGTH INCHES	EFFECTIVITY	ACCESS
D	A, B	1	FS 963	FS 983	-251	20	001-031	137AB
D	A, B	1	FS 963	FS 983	-333	28	032-033	137BB
D	A	2	FS 983	LES 55	-329	162	001-006	137AB, 193A
D	B	2	FS 983	LES 55	-331	180	001-006	137AB, 193A
D	A	2	FS 983	LES 55	-155	126	008-999	137AB, 193A
D	B	2	FS 983	LES 55	-331	180	008-999	137AB, 193A
D	A, B	3	LES 55	LES 200	-303	155	ALL	511BB, 511DB, 511EB, 511FB, 511GB
D	A, B	4	LES 200	LES 350	-305	165	ALL	511GB, 511HB, 511JB, 511KB, 511LB-A
D	A, B	5	LES 350	LES 365	-301	36	001-006	511LB-A, 511LB-B
E	A, B	1	FS 963	FS 983	-333	28	ALL	137DB
E	A	2	FS 983	LES 55	-329	162	001-006	137DB, 194A
E	B	2	FS 983	LES 55	-331	180	001-006	137DB, 194A
E	A	2	FS 983	LES 55	-155	126	008-999	137DB, 194A
E	B	2	FS 983	LES 55	-331	180	008-999	137DB, 194A
E	A, B	3	LES 55	LES 200	-303	155	ALL	611BB, 611DB, 611EB, 611FB, 611GB
E	A, B	4	LES 200	LES 350	-305	165	ALL	611GB, 611HB, 611JB, 611KB, 611LB-A
E	A, B	5	LES 350	LES 365	-301	36	001-006	611LB-A, 611LB-B
F	A, B	1	LES 355	LES 400	-301	36	001-006	511HB, 511KB, 511LB-A, 511LB-B
F	A, B	2	LES 400	LES 424	-121	22	001-006	511LB-B, 521AB
F	A, B	3	LES 424	LES 430	-119	18	001-006	521AB
F	A	1	LES 350	LES 424	-141	102	008-999	511HB, 511KB, 511LB-A, 511LB-B, 521AB
F	B	1	LES 350	LES 424	-357	106	008-999	511HB, 511KB, 511LB-A, 511LB-B, 521AB
F	A, B	2	LES 424	LES 430	-119	18	008-999	521AB
G	A, B	1	LES 355	LES 400	-301	36	001-006	611HB, 611KB, 611LB-A, 611LB-B
G	A, B	2	LES 400	LES 424	-121	22	001-006	611LB-B, 621AB
G	A, B	3	LES 424	LES 430	-119	18	001-006	621AB
G	A	1	LES 350	LES 424	-141	102	008-999	611HB, 611KB, 611LB-A, 611LB-B, 621AB
G	B	1	LES 350	LES 424	-357	106	008-999	611HB, 611KB, 611LB-A, 611LB-B, 621AB
G	A, B	2	LES 424	LES 430	-119	18	008-999	621AB
H	A, B	1	FS 963	FS 983	-251	20	ALL	137BB
H	A	2	FS 983	FS 1123	-169	156	001-006	137BB, 142DB, 142EB, 142GB
H	B	2	FS 983	FS 1123	-191	162	001-006	137BB, 142DB, 142EB, 142GB
H	A	2	FS 983	FS 1103	-167	132	008-999	137BB, 142DB, 142EB, 142GB
H	B	2	FS 983	FS 1103	-157	146	008-999	137BB, 142DB, 142EB, 142GB
H	A, B	3	FS 1123	FS 1190	-263	72	001-006	142EB, 142GB
H	A, B	3	FS 1103	FS 1163	-349	62	008-999	142EB, 142GB
H	A, B	4	FS 1198	FS 1283	-327	94	001-006	142GB, 147AB
H	A, B	4	FS 1163	FS 1203	-313	132	008-999	142GB, 147AB
H	A	5	FS 1283	FS 1351 RBL 42.5	-313	132	001-006	147AB, 147BB
H	B	5	FS 1283	FS 1351 RBL 42.5	-311	144	001-006	147AB, 147BB
H	A	5	FS 1283	FS 1356 RBL 42.5	-305	155	008-999	147AB, 147BB
H	B	5	FS 1283	FS 1356 RBL 42.5	-329	162	008-999	147AB, 147BB

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Area Overheat Sensors
Table 401 (Sheet 2)

EFFECTIVITY: ALL

001B

CHANNEL	LOOP	SEGMENT	BEGIN	END	LOCKHEED PART NO. 740969-XXX	LENGTH INCHES	EFFECTIVITY	ACCESS
H	A	6	FS 1351 RBL 42.5	FS 1408 RBL 89	-145	108	001-006	147BB, 154BT, 154DT, 196D
H	B	6	FS 1351 RBL 42.5	FS 1408 RBL 89	-153	120	001-006	147BB, 154BT, 154DT, 196D
H	A	6	FS 1356 RBL 42.5	FS 1408 RBL 89	-141	102	008-999	147BB, 154BT, 154DT, 196D
H	B	6	FS 1356 RBL 42.5	FS 1408 RBL 89	-275	100	008-999	147BB, 154BT, 154DT, 196D
J	A, B	1	FS 1343 LBL 32	FS 1353 LBL 42	-309	30	001-006	195D
J	A	2	FS 1353 LBL 42	FS 1363 LBL 73	-123	36	001-006	147BB, 195D
J	B	2	FS 1353 LBL 42	FS 1363 LBL 73	-127	48	001-006	147BB, 195D
J	A	3	FS 1363 LBL 73	FS 1403 WL 116	-281	66	001-006	147BB, 195D
J	B	3	FS 1363 LBL 73	FS 1403 WL 116	-279	74	001-006	147BB, 195D
J	A	4	FS 1363 WL 116	FS 1393 WL 146	-281	66	001-006	147BB, 195B
J	B	4	FS 1363 WL 116	FS 1390	-309	30	001-006	147BB, 195B
J	B	4	FS 1390	FS 1393 WL 146	-251	20	001-006	147BB, 195B
J	A	5	FS 1393 WL 180	FS 1443 WL 180	-145	70	001-006	195B, 195D, 153DL
J	B	5	FS 1393 WL 180	FS 1443 WL 180	-279	74	001-006	195B, 195D, 153DL
J	A, B	6	FS 1520 WL 180	FS 1585 WL 180	-289	67	001-006	153FL, 153HL
J	A, B	7	FS 1585 WL 180	FS 1685 WL 180	-145	108	001-006	153HL, 163AL, 163BL
J	A, B	8	FS 1745 WL 180	FS 1830 WL 180	-141	102	001-006	163CL, 316BB
J	A	9	FS 1830 WL 180	FS 1860 WL 180	-277	110	001-006	316BB
J	B	9	FS 1830 WL 180	FS 1860 WL 180	-275	100	001-006	316BB
J	A, B	10	FS 1860 WL 180	FS 1917 WL 265	-157	138	001-006	317AB, 313FR
J	A, B	11	FS 1917 WL 265	FS 1966	-155	126	001-006	317AB, 313FR
J	A	12	FS 1966	FS 2025 WL 340	-189	82	001-006	313FR, 471AR
J	B	12	FS 1966	FS 2025 WL 340	-171	84	001-006	313FR, 471AR
J	A	13	FS 2025 WL 340	FS 2065 WL 340	-147	56	001-006	471AR
J	B	13	FS 2025 WL 340	FS 2065 WL 340	-133	54	001-006	471AR
J	A, B	1	FS 1363 LBL 10	FS 1380 LBL 40	-169	156	008-999	147BB, 195B

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Area Overheat Sensors
Table 401 (Sheet 3)

EFFECTIVITY: ALL

001B

CHANNEL	LOOP	SEGMENT	BEGIN	END	LOCKHEED PART NO. 340969-XXX	LENGTH INCHES	EFFECTIVITY	ACCESS
J	A	2	FS 1380 LBL 90	FS 1502 LBL 85	-167	150	008-999	195B, 195D, 193DL, 153FL
J	B	2	FS 1380 LBL 90	FS 1502 LBL 85	-305	165	008-999	195B, 195D, 193DL, 153FL
J	A, B	3	FS 1502 LBL 85	FS 1645 LBL 85	-165	140	008-999	153FL, 153HL, 163AL
J	A, B	4	FS 1645 LBL 85	FS 1745 LBL 85	-357	106	008-999	163AL, 1636L, 163CL
J	A, B	5	FS 1745 LBL 85	FS 1825 LBL 85	-137	90	008-999	163CL, 3168B
J	A	6	FS 1826 LBL 74	FS 1918 WL 178	-313	132	008-999	316BB, 317AB, 313FR
J	B	6	FS 1826 LBL 74	FS 1918 WL 178	-347	141	008-999	316BB, 317AB, 313FR
J	A, B	7	FS 1860 WL 178	FS 1898 WL 266	-313	132	008-999	313FR
J	A, B	8	FS 1898 WL 266	FS 1956 WL 327	-313	132	008-999	313FR, 471AR
J	A	9	FS 1956 WL 327	FS 2046 WL 350	-155	126	008-999	313FR, 471AR
J	B	9	FS 1956 WL 327	FS 2046 WL 350	-273	104	008-999	313FR, 471AR

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Area Overheat Sensors
Table 401 (Sheet 4)

EFFECTIVITY: ALL

001B

ENGINE NO. 1 PYLON AREA OVERHEAT SENSORS REMOVAL AND INSTALLATION

1. General

The engine No. 1 wing pylon overheat sensors are located in the pylon at the pylon station 239, between pylon WL 110 and 126 to the right of 0.0 pylon BL. These sensors are electrically connected in series with the sensors in zone 3 of the engine (Ref. 36-22-23).

The following figures provide general and detailed locations, access, and installation guidance for all sensors included in engine No. 1 pylon bleed air area overheat warning system:

36-22-02, Figure 401 Area Overheat Sensor Channel Locations

36-22-02, Figure 402 Area Overheat Sensor Installation Guide

Figure 401 Area Overheat Sensors, Engine No. 1 Pylon - Removal and Installation

The following are general conditions that must be observed when removing or installing sensor elements (Ref. 36-22-02, Fig. 402):

R CAUTION: THE SENSING ELEMENT MUST BE CONSIDERED AS AN ELECTRICAL INSTRUMENT, THEREFORE, THE ELEMENT MUST BE HANDLED WITH CARE. NEW ELEMENTS ARE SHIPPED IN COILS WHICH MUST BE RESHAPED TO FIT IN THE SPECIFIED AREA IN THE PYLON. WHEN RESHAPING AN ELEMENT, AVOID TWISTING, KINKING OR EXCESSIVE BENDING.

All sensor elements are identified by Dwg No. 740969-XXX on each element.

When tightening connectors, apply 50-60 lb in. torque.

Use protective caps on connectors until ready to mate the connectors.

The area of removal or installation work must be clean.

The minimum bend radius of an element is one inch. The elements bend contour is illustrated in Figure 401.

An element must be supported at the beginning and end of each bend with a 0.50-inch straight length in the element between the bend and support clip.

Support point protective grommets must be free of cracks or other signs of deterioration.

The protective grommets must be positioned in the center of the mounting clip so that the element cannot work out of the grommet through the split and make contact with the metal clip.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Electrical connector protective caps

3. Referenced Procedures

6-40-00	Exterior Access Doors and Removable Panels
36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test
36-22-02	Figure 401 Area Overheat Sensor Channel Locations
36-22-02	Figure 402 Area Overheat Sensor Installation Guide
78-30-00	Thrust Reverser - Servicing

4. Removal/Installation

R A. Removal

R (1) At the Flight Engineer/Second Officers (FE/SO) station, R tag the engine bleed control panel, APU control panel R and the hydraulic system panel.

R (2) In the flight station, tag the flap control handle on R the pilots center console.

R (3) Deactivate the engine thrust reverser in the retracted R position (Ref. 78-30-00, thrust reverser - servicing).

R (4) In the hydraulic service center, tag the hydraulic R service panel.

R (5) Underneath the fuselage, tag the three external R high-pressure ground air connections and the APU R external control panel.

R R (6) On FE/SO aft circuit breaker panel, CB3, open and tag the following circuit breakers:

NO. 1 ENG OVHT LOOP A/ALARM (L1)

NO. 1 ENG OVHT LOOP A/PWR (L2)

NO. 1 ENG OVHT LOOP B/ALARM (L3)

NO. 1 ENG OVHT LOOP B/PWR (L4)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

R R (7) On pilots overhead circuit breaker panel, CB1, open and tag the following circuit breaker:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 1 (G10)

R (8) Remove access panel 453DR (Ref. Fig. 401).

R R R (9) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

R R WARNING: WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY AFTER THE PNEUMATIC SYSTEM HAS BEEN OPERATING.

R (10) Remove lock-wire from harness connectors.

R R (11) Uncouple harness connectors from sensor connectors and install protective caps on all connectors.

R R R (12) Unlock sensor support assembly with attached sensors from pylon by unlocking the two Camloc fasteners. Remove the complete assembly from the pylon.

R R R (13) To remove sensor element from support assembly, open each support clip and separate the sensor element from the clips.

R (14) Remove the protective caps from the sensor connectors.

R (15) Remove lock-wire from sensor connectors.

R R (16) Disconnect sensor connectors from support assembly end bracket and install protective caps on connectors.

R (17) Remove protective grommets from each sensor element.

R (18) Inspect the condition of each grommet to determine
R whether it can be reused or has to be replaced.

B. Installation

R (1) Make sure that panels listed in Paragraph 4A are
R tagged, the thrust reverser is deactivated in the
R retracted position, and that circuit breakers listed in
R Steps 4A(6) and 4A(7) are open and tagged.

(2) Remove access panel 453DR (Ref. Fig. 401).

(3) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(4) Remove protective caps from replacement sensor and install connectors to support assembly and bracket. Apply lock-wire to the connector and add protective caps on the open connectors.

(5) Shape the sensor element to conform to the contours illustrated in Figure 401.

(6) Place the protective grommets on the sensor element and position the encased portions of the element in the clips.

(7) Close the clip around each grommet, then tighten.

(8) Install the sensor support assembly inside of the pylon structure by locking the two Camloc fasteners to the structure.

(9) Remove protective caps from the harness and sensor connectors and mate the connectors. Tighten the connectors and apply lock-wire.

R (10) Remove tags and close circuit breakers opened in Steps
R 4A(6) and 4A(7).

R (11) Remove tags from the following panels and fittings that
R were tagged in Paragraph 4A:

R At FE/SO station:

ENGINE BLEED CONTROL

APU CONTROL

Underneath the fuselage:

The three external high-pressure ground air connections

The APU external control panel

(12) Perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

(13) Reinstall access panel 453DR on the pylon.

(14) Reactivate the engine thrust reverser.

(15) Remove tags from the following panels and fittings that
R were tagged in Paragraph4A:

R At FE/SO station:

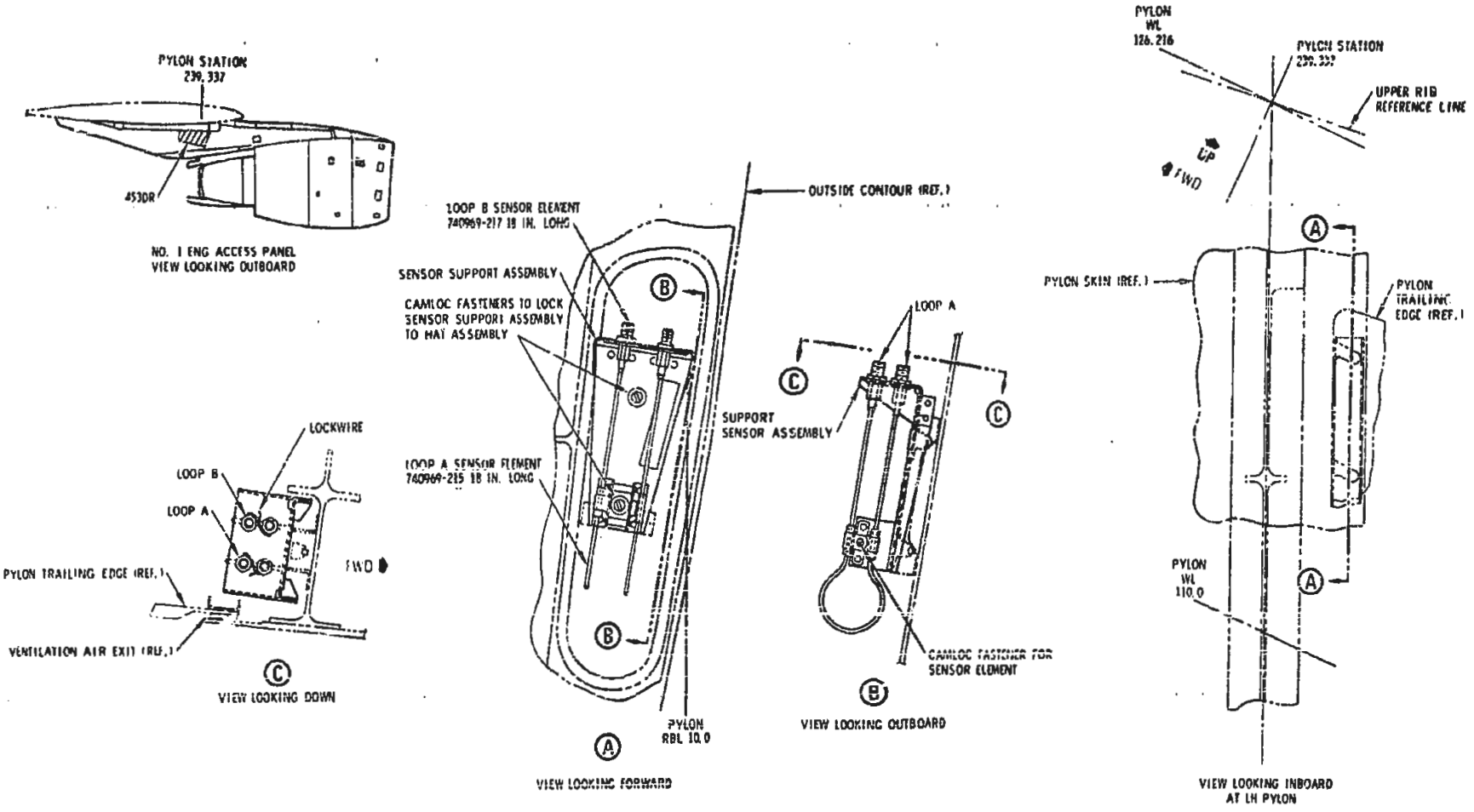
HYDRAULIC SYSTEM

At the flight station on the pilots center console:

The flap control handle

In the hydraulic service center:

HYDRAULIC SERVICE PANEL



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R Area Overheat Sensors, Engine No. 1 Pylon - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

ENGINE NO. 2 AREA OVERHEAT SENSORS REMOVAL AND INSTALLATION

1. General

The engine No. 2 area overheat sensors are located in the engine support structure, and over the engine thrust reverser area. These two separate sensor assemblies are electrically connected in series with each other and also with the sensors assembly in zone 3 of the engine (Ref. 36-22-23).

The removal and installation procedures for the engine support structure sensors are covered in Paragraph 4, and for the sensors over the engine thrust reverser area, in Paragraph 5.

The following figures provide general and detailed locations, access, and installation guidance for all sensors for engine No. 2 except the engine zone 3 sensor assembly:

36-22-02, Figure 401 Area Overheat Sensor Channel Locations

36-22-02, Figure 402 Area Overheat Sensor Installation Guide

Figure 401 Area Overheat Sensors, Engine No. 2 - Removal and Installation

The following are general conditions that must be observed when removing or installing sensor elements (Ref. 36-22-02, Fig. 401):

R CAUTION: THE SENSING ELEMENT MUST BE CONSIDERED AS AN ELECTRICAL INSTRUMENT, THEREFORE, THE ELEMENT MUST BE HANDLED WITH CARE. NEW ELEMENTS ARE SHIPPED IN COILS WHICH MUST BE RESHAPED TO FIT IN THE ENGINE NO. 2 AREA. WHEN RESHAPING AN ELEMENT, AVOID TWISTING, KINKING OR EXCESSIVE BENDING.

All sensor elements are identified by Dwg No. 740969-XXX on each element.

When tightening connectors, apply 35-40 lb in. torque.

Use protective caps on connectors until ready to mate the connectors.

The area of removal or installation work must be clean.

The minimum bend radius of an element is one inch. The elements bend contour is illustrated in Figure 401.

An element must be supported at the beginning and end of each bend with a 0.50-inch straight length in the element between the bend and a support clip.

Support point protective grommets must be free of cracks or other signs of deterioration.

The protective grommets must be positioned in the center of the mounting clip so that the element cannot work out of the grommet through the split and make contact with the metal clip.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Electrical connector protective caps

R Sealant, LCM 40-2180, Lockheed Aircraft Corporation, or equivalent

3. Referenced Procedures

	6-40-00	Exterior Access Doors and Removable Panels
	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test
	36-22-02	Figure 401 Area Overheat Sensor Channel Locations
	36-22-02	Figure 402 Area Overheat Sensor Installation Guide
	78-30-00	Thrust Reverser - Servicing
R	20-51-04	Environmental Sealing - Maintenance Practices

4. Removal/Installation

Engine No. 2 Support Structure Sensor Assembly

A. Removal

(1) At Flight Engineer/Second Officers (FE/SO) station, tag engine bleed control panel and APU control panel.

(2) Underneath fuselage, tag three external high-pressure ground air connections and APU external control panel.

R (3) Deactivate engine thrust reverser in the retracted
R position (Ref. 78-30-00, thrust reverser - servicing).

R (4) On FE/SO aft circuit breaker panel, CB3, open and tag
R following circuit breakers:

NO. 1 ENG OVHT LOOP B/PWR (L4)

NO. 2 ENG OVHT LOOP A/ALARM (L7)

NO. 2 ENG OVHT LOOP A/PWR (L8)

NO. 2 ENG OVHT LOOP B/ALARM (L9)

NO. 2 ENG OVHT LOOP B/PWR (L10)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

R (5) On pilots overhead circuit breaker panel, CB1, open and
R tag following circuit breaker:

ENGINE BLEED CONTROL/ENG ISLM VALVES/ENG 2 (G11)

R (6) Remove access panels 471AL and 471DL (Ref. Fig. 401).

R (7) Observe the general rules for handling of sensors.
R These rules are outlined in Paragraph 1, and are
R illustrated in 36-22-02, Figure 402.

R WARNING: WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY
R AFTER THE PNEUMATIC SYSTEM HAS BEEN OPERATING OR
R THE ENGINE SHAS SHUT DOWN.

R (8) Remove lock-wires from connectors at each end of both
R sensor elements.

R (9) Unlock the five Camloc fasteners that hold the sensor
R support tube on the engine support structure mounting
R brackets.

R (10) Release sensors support tube with sensors attached from
R the engine support brackets. Exercise care when
R separating the electrical connectors at each end.
R Release the forward end connectors first, then the aft
R end connectors.

R (11) Install protective caps on all connectors.

R (12) Remove the support tube with sensors attached from the
R engine support structure area through the most
R convenient access opening.

R (13) To remove the sensor elements from the support tube,
R open the support clips and separate the sensor element
R from the clips.

R (14) Remove protective caps and lock-wire from the forward
R connectors.

R (15) Disconnect sensor connectors from the support tube
R forward bracket and reinstall the protective caps.

R (16) Remove the protective grommets from each sensor
R element.

R (17) Inspect the condition of each grommet to determine
R whether it can be reused or has to be replaced.

B. Installation

R (1) Make sure that the panels listed in Paragraph 4A are
R tagged, the thrust reverser is deactivated in the
R retracted position, and that circuit breakers listed in
R Steps 4A(4) and 4A(5) are open and tagged.

(2) Remove access panels 471AL and 471DL (Ref. Fig. 401).

(3) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(4) Remove protective caps from replacement sensor connectors and install forward connectors to the support tube end bracket. Apply lock-wire to the connectors. Install protective caps on the open end of the connectors.

(5) Shape the sensor element to conform to the contours of the support tube as illustrated in Figure 401.

(6) Place the protective grommets on the sensor element and position the encased portions of the element in the support tube clips.

(7) Close the clip around each grommet, then tighten.

(8) Insert the entire assembly into the engine support structure area through the most convenient access opening.

(9) Remove the protective caps and mate the forward electrical connectors. Apply lock-wire to the connectors.

R (10) Apply sealant between surfaces of support tube brackets and engine support structure brackets.

(11) Align the support tube brackets Camloc fasteners with the engine support structure brackets and insert the Camloc fasteners into the keyholes.

(12) Lock the five Camloc fasteners to the engine support structure mounting brackets.

(13) Remove the protective caps from the aft connectors and the harness connectors.

(14) Mate the aft electrical connectors. Apply lock-wire to the aft electrical connectors.

(15) Remove tags and close circuit breakers opened in Steps 4A(4) and 4A(5).

(16) Remove tags from the panels listed in Paragraph 4A. Do not reactivate the engine thrust reverser.

(17) Perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

(18) Install access panels 471AL and 471DL.

(19) Reactivate the engine thrust reverser.

5. Removal/Installation

Engine No. 2 Over Thrust Reverser Area Sensor Assembly

A. Removal

(1) At FE/SO station, tag engine bleed control panel and APU control panel.

(2) Underneath fuselage, tag three external high-pressure ground air connections and APU external control panel.

(3) Deactivate engine thrust reverser in the retracted position (Ref. 78-30-00, thrust reverser - servicing).

(4) On FE/SO aft circuit breaker panel, CB3, open and tag following circuit breakers:

NO. 1 ENG OVHT LOOP B/PWR (L4)

NO. 2 ENG OVHT LOOP A/ALARM (L7)

NO. 2 ENG OVHT LOOP A/PWR (L8)

NO. 2 ENG OVHT LOOP B/ALARM (L9)

NO. 2 ENG OVHT LOOP B/PWR (L10)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

R (5) On pilots overhead circuit breaker panel, CB1, open and tag following circuit breaker:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 2 (G11)

R (6) Remove thrust reverser fairing panel, 435AL, from No. 2 engine (Ref. Fig. 401).

R (7) Observe the general rules for handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

R WARNING: WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY AFTER THE PNEUMATIC SYSTEM HAS BEEN OPERATING OR THE ENGINE HAS SHUT DOWN.

R (8) Remove lock-wires from the four connectors and disconnect the sensor connectors from the harness connectors. Install protective caps on exposed connectors.

R (9) Release the three Camloc fasteners that hold the sensor assembly to the engine support structure bracket. Remove the sensor assembly.

R (10) To remove sensor elements from the mounting bracket, open the support clips and separate each sensor element from the clips.

R (11) Remove lock-wire from sensor connectors on the support assembly bracket.

R (12) Remove protective caps from the connectors and disconnect the sensor connectors from the support assembly. Reinstall the protective caps on the open end of the connectors.

R (13) Remove the protective grommets from sensor elements.

(14) Inspect the condition of each grommet to determine whether it can be reused or has to be replaced.

B. Installation

(1) Make sure that the panels listed in Paragraph 5A are tagged, the thrust reverser is deactivated in the retracted position, and that the circuit breakers listed in Steps 5A(4) and 5A(5) are open and tagged.

(2) Remove thrust reverser fairing panel, 435AL, from No. 2 engine (Ref. Fig. 401).

(3) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(4) Remove protective caps from replacement sensor connectors and install connectors on the support assembly bracket. Apply lock-wire to each connector.

(5) Reinstall the protective caps on each connector.

(6) Shape the sensor element to conform to the contours illustrated in Figure 401.

(7) Place the protective grommets on the sensor element and position each encased portion of the element in the clips.

(8) Close the clip around each grommet, then tighten.

R (9) Apply sealant between assembly support points and engine support structure.

(10) Insert the entire assembly into the space underneath the engine support structure and lock assembly in place with the three Camloc fasteners.

(11) Remove protective caps from all connectors and mate the connectors. Tighten the connectors and apply lock-wire to each connector.

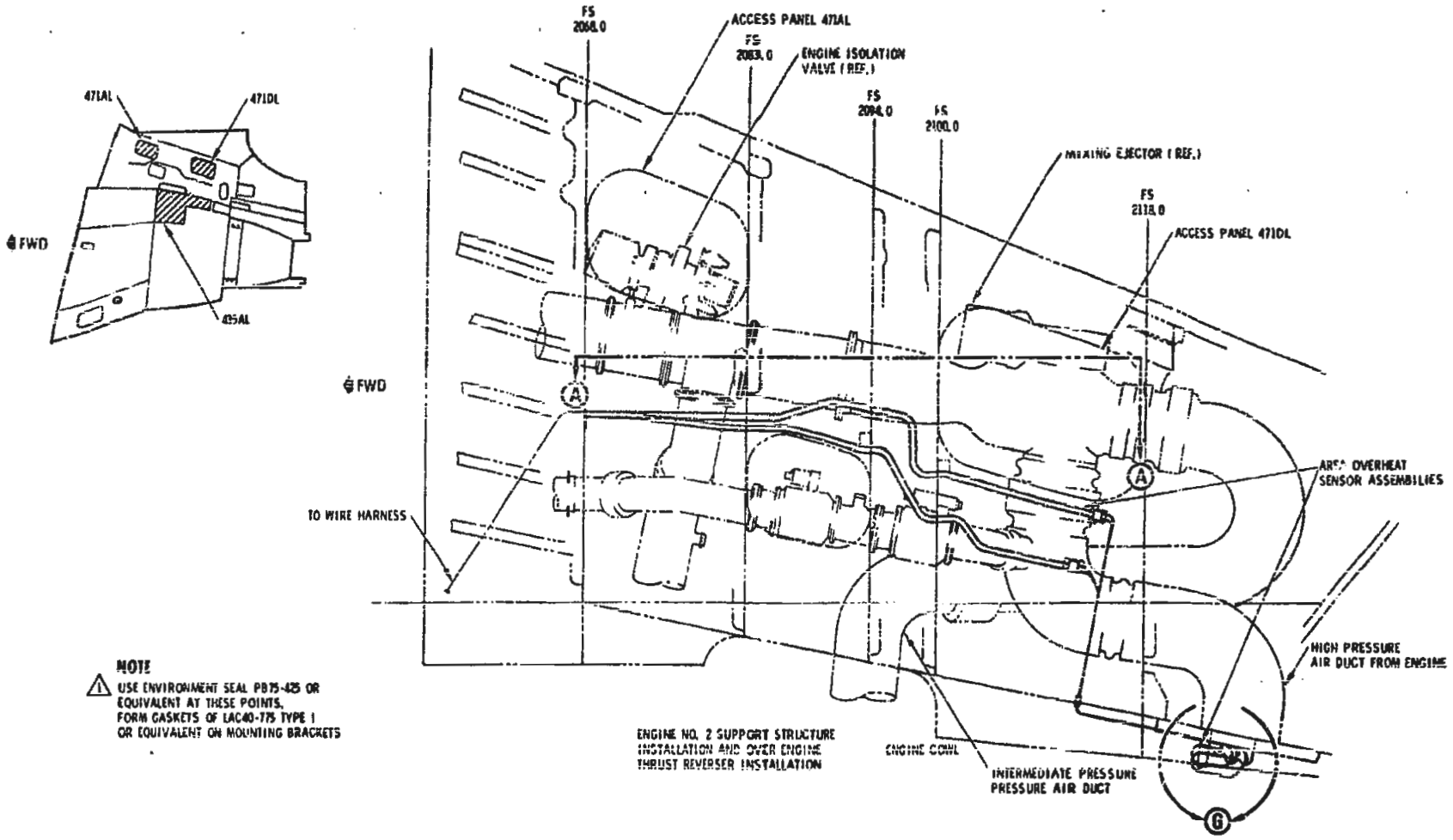
(12) Remove tags and close circuit breakers opened in Steps 5A(4) and 5A(5).

(13) Remove tags from the panels listed in Paragraph 5A . Do not reactivate the thrust reverser.

(14) Perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

(15) Install thrust reverser fairing panel, 435AL, on No. 2 engine.

(16) Reactivate the engine thrust reverser.



Area Overheat Sensors, Engine No. 2
Removal and Installation
Figure 401 (Sheet 1)

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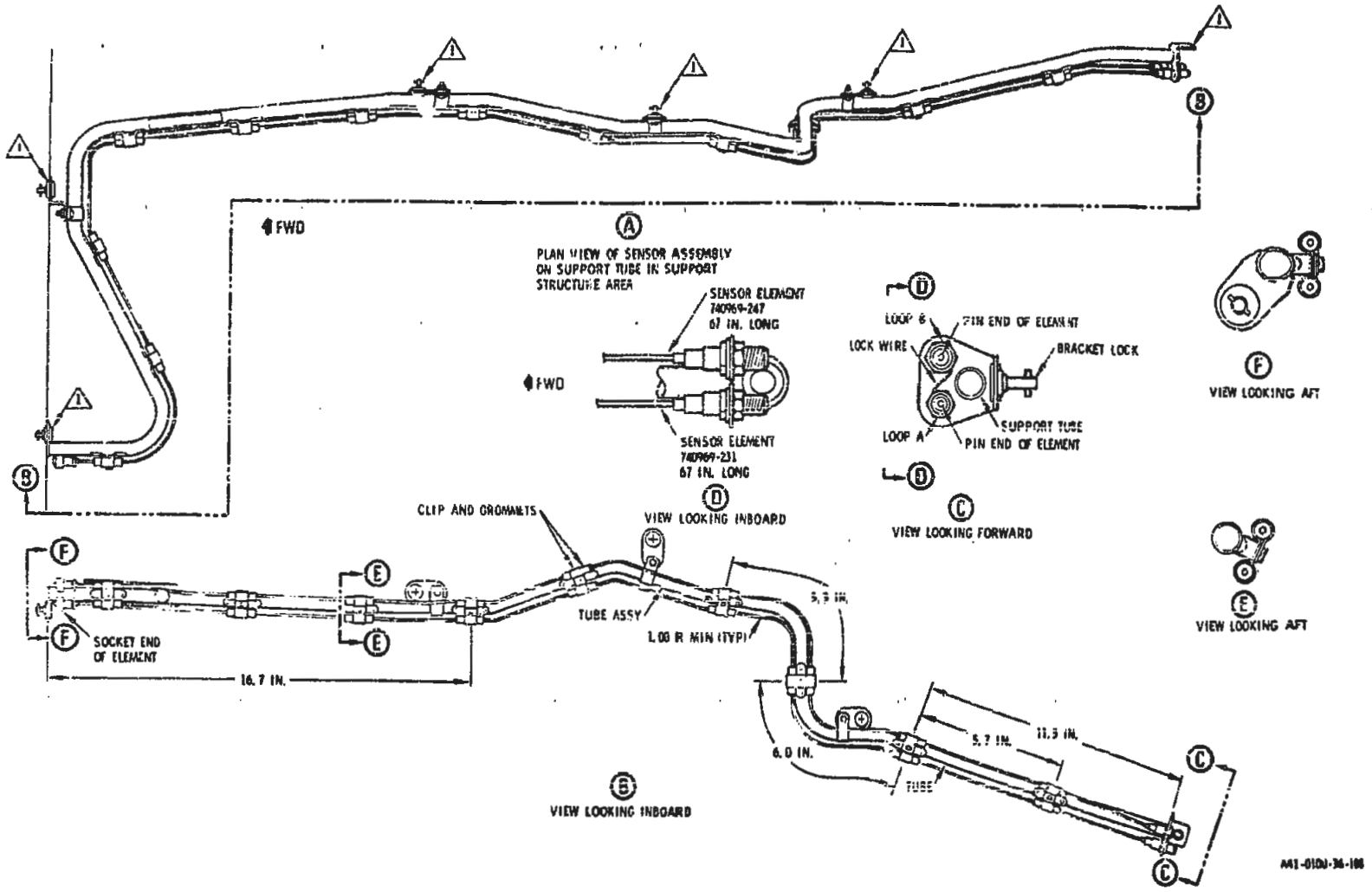
EFFECTIVITY: ALL



Area Overheat Sensors, Engine No. 2
Removal and Installation
Figure 401 (Sheet 2)

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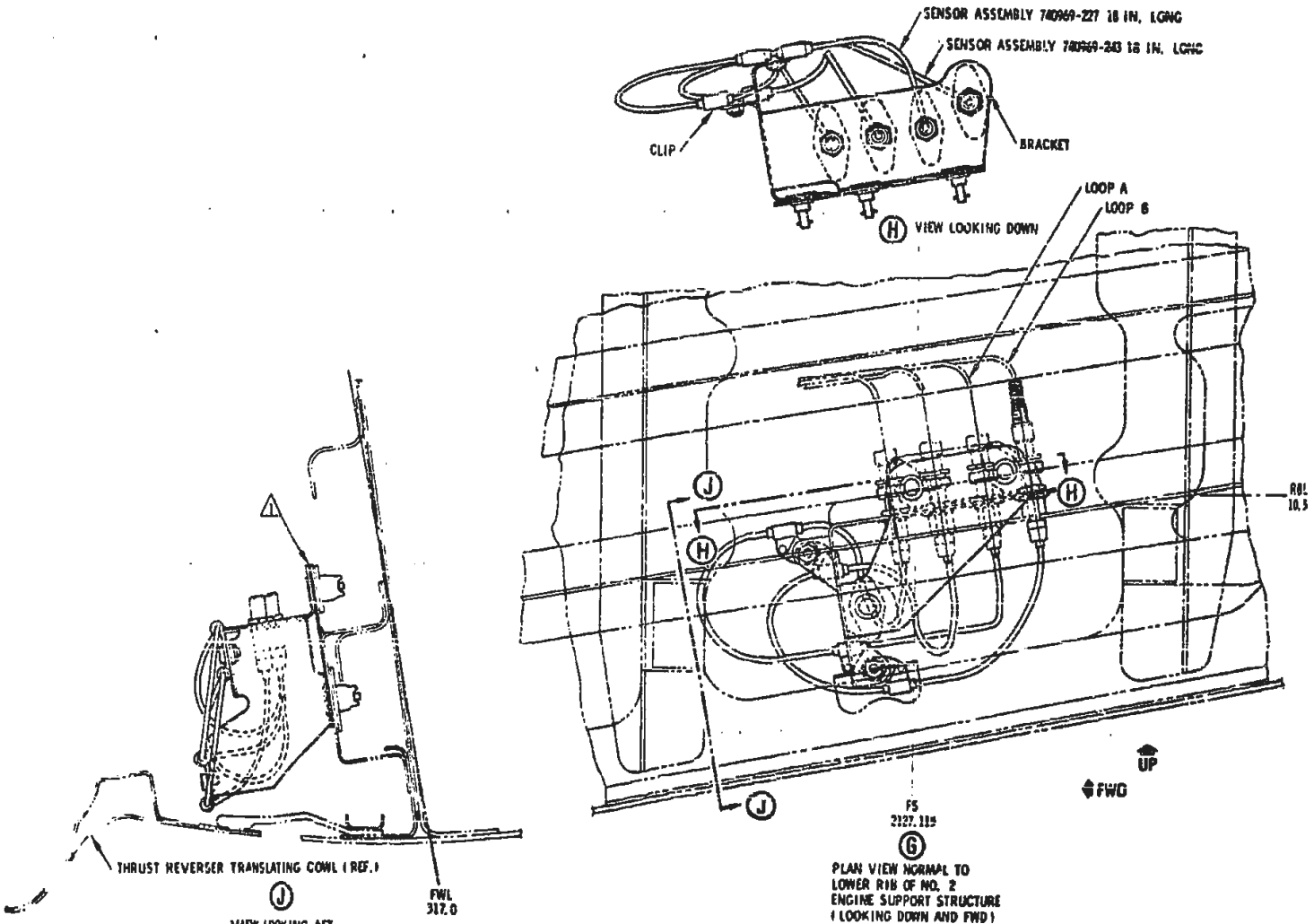
EFFECTIVITY: ALL

001B



Area Overheat Sensors, Engine No. 2
Removal and Installation
Figure 401 (Sheet 3)

R

EFFECTIVITY: ALL

001B

ENGINE NO. 3 PYLON AREA OVERHEAT SENSORS REMOVAL AND INSTALLATION

1. General

The engine No. 3 wing pylon overheat sensors are located in the pylon at the pylon station 239, between pylon WL 110 and 126 to the left of 0.0 pylon BL. These sensors are electrically connected in series with the sensors in zone 3 of the engine (Ref. 36-22-23).

The following figures provide general and detailed locations, access, and installation guidance for all sensors included in engine No. 3 pylon bleed air area overheat warning system:

36-22-02, Figure 401 Area Overheat Sensor Channel Locations

36-22-02, Figure 402 Area Overheat Sensor Installation Guide

Figure 401 Area Overheat Sensors, Engine No. 3 Pylon - Removal and Installation

The following are general conditions that must be observed when removing or installing sensor elements (Ref. 36-22-02, Fig. 402):

R CAUTION: THE SENSING ELEMENT MUST BE CONSIDERED AS AN ELECTRICAL INSTRUMENT, THEREFORE, THE ELEMENT MUST BE HANDLED WITH CARE. NEW ELEMENTS ARE SHIPPED IN COILS WHICH MUST BE RESHAPED TO FIT IN THE SPECIFIED AREA IN THE PYLON. WHEN RESHAPING AN ELEMENT, AVOID TWISTING, KINKING OR EXCESSIVE BENDING.

All sensor elements are identified by Dwg No. 740969-XXX on each element.

When tightening connectors, apply 50-60 lb in. torque.

Use protective caps on connectors until ready to mate the connectors.

The area of removal or installation work must be clean.

The minimum bend radius of an element is one inch. The elements bend contour is illustrated in Figure 401.

An element must be supported at the beginning and end of each bend with a 0.50-inch straight length in the element between the bend and support clip.

Support point protective grommets must be free of cracks or other signs of deterioration.

The protective grommets must be positioned in the center of the mounting clip so that the element cannot work out of the grommet through the split and make contact with the metal clip.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Electrical connector protective caps

3. Referenced Procedures

	6-40-00	Exterior Access Doors and Removable Panels
	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test
R	36-22-02	Figure 401 Area Overheat Sensor Channel Locations
R	36-22-02	Figure 402 Area Overheat Sensor Installation Guide
	78-30-00	Thrust Reverser - Servicing

4. Removal/Installation

WARNING: AT THE FLIGHT ENGINEER/SECOND OFFICERS STATION, TAG THE ENGINE BLEED CONTROL PANEL, APU CONTROL PANEL AND THE HYDRAULIC SYSTEM PANEL.

IN THE FLIGHT STATION, TAG THE FLAP CONTROL HANDLE ON THE PILOTS CENTER CONSOLE.

DEACTIVATE THE ENGINE THRUST REVERSER IN THE RETRACTED POSITION (REF. 78-30-00, THRUST REVERSER - SERVICING).

IN THE HYDRAULIC SERVICE CENTER, TAG THE HYDRAULIC SERVICE PANEL.

UNDERNEATH THE FUSELAGE, TAG THE THREE EXTERNAL HIGH-PRESSURE GROUND AIR CONNECTIONS AND THE APU EXTERNAL CONTROL PANEL.

WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY AFTER THE PNEUMATIC SYSTEM HAS BEEN OPERATING.

A. Removal

(1) On the Flight Engineer/Second Officers aft circuit breaker panel, CB3, open and tag the following circuit breakers:

NO. 1 ENG OVHT LOOP B/PWR (L4)

NO. 3 ENG OVHT LOOP A/ALARM (L13)

NO. 3 ENG OVHT LOOP A/PWR (L14)

NO. 3 ENG OVHT LOOP B/ALARM (L15)

NO. 3 ENG OVHT LOOP B/PWR (L16)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

(2) On pilots overhead circuit breaker panel, CB1, open and tag the following circuit breaker:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 3 (G12)

R (3) Remove access panel 463DL (Ref. Fig. 401).

(4) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(5) Remove lock-wire from harness connectors.

(6) Uncouple harness connectors from sensor connectors and install protective caps on all connectors.

(7) Unlock sensor support assembly with attached sensors from pylon by unlocking the two Camloc fasteners. Remove the complete assembly from the pylon.

(8) To remove sensor element from support assembly, open each support clip and separate the sensor element from the clips.

(9) Remove the protective caps from the sensor connectors.

(10) Remove lock-wire from sensor connectors.

(11) Disconnect sensor connectors from support assembly and bracket and install protective caps on connectors.

(12) Remove protective grommets from each sensor element.

(13) Inspect the condition of each grommet to determine whether it can be reused or has to be replaced.

B. Installation

(1) Make sure that panels listed in Paragraph 4 WARNING are tagged, the thrust reverser is deactivated in the R retracted position, and that circuit breakers listed in R Steps 4A(1) and 4A(2) are open and tagged.

R (2) Remove access panel 463DL (Ref. Fig. 401).

(3) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(4) Remove protective caps from replacement sensor and install connectors to support assembly end bracket. Apply lock-wire to the connectors and add protective caps on the open connectors.

(5) Shape the sensor element to conform to the contours illustrated in Figure 401.

(6) Place the protective grommets on the sensor element and position the encased portions of the element in the clips.

(7) Close the clip around each grommet, then tighten.

(8) Install the sensor support assembly inside of the pylon structure by locking the two Camloc fasteners to the structure.

(9) Remove protective caps from the harness and sensor connectors and mate the connectors. Tighten the connectors and apply lock-wire.

R (10) Remove tags and close circuit breakers opened in Steps R 4A(1) and 4A(2).

(11) Remove tags from the following panels and fittings that were tagged in Paragraph 4 WARNING:

At the Flight Engineer/Second Officers station:

ENGINE BLEED CONTROL

APU CONTROL

Underneath the fuselage:

The three external high-pressure ground air connections

The APU external control panel

(12) Perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

R (13) Reinstall access panel 463DL on the pylon.

(14) Reactivate the engine thrust reverser.

(15) Remove tags from the following panels and fittings that were tagged in Paragraph 4 WARNING:

At the Flight Engineer/Second Officers station:

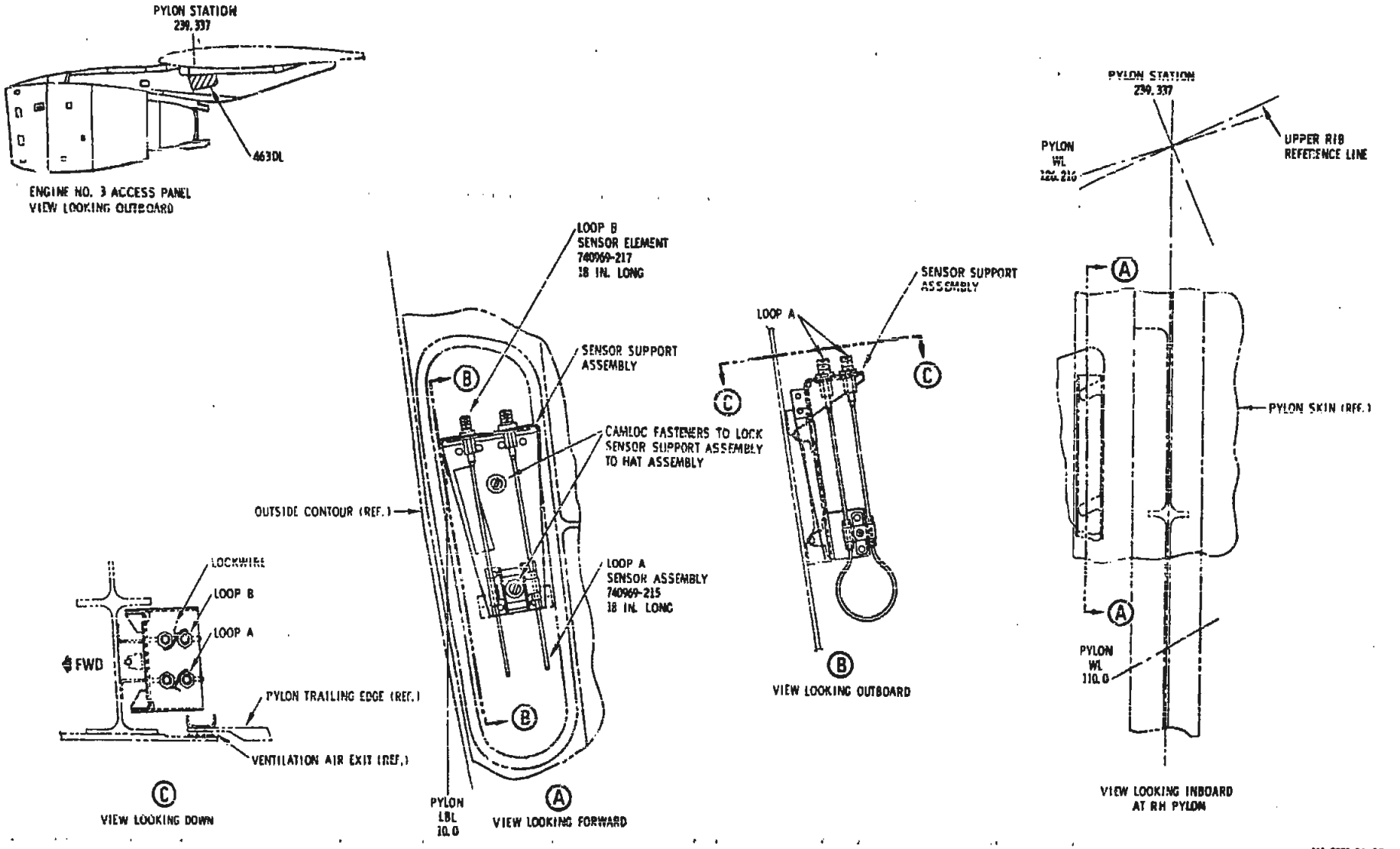
HYDRAULIC SYSTEM

At the flight station on the pilots center console:

The flap control handle

In the hydraulic service center:

HYDRAULIC SERVICE PANEL



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R Area Overheat Sensors, Engine No. 3 Pylon - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

FORWARD CARGO COMPARTMENT HEAT EXCHANGER THERMAL SWITCH REMOVAL AND INSTALLATION

1. General

The forward cargo compartment heat exchanger thermal switch is installed on the heat exchanger shroud under the forward cargo compartment floor, zone 124. It is located forward and outboard of the bleed air pack No. 1 (Ref. Fig. 401).

2. Equipment and Materials

Protective caps

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

3. Referenced Procedure

6-50-00	Interior Access Doors and Removable Panels - Description and Operation
25-52-07	Fixed Drive Assembly - Removal and Installation
36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test

4. Removal/Installation

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

A. Removal

(1) Tag Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker DUCT AREA OVHT DET - DC (W13).

(3) On aircraft 001-031 without SB 53-062, remove fixed drive assembly from forward cargo

compartment floor panel 124 HT (Ref. 25-52-07 and 6-50-00).

(3) On aircraft 001-031 with SB 53-062, and 032-999, remove forward cargo compartment floor panel 124 HT-1 (Ref. 6-50-00).

(4) Disconnect electrical cable connector from thermal switch.

(5) Install protective caps on cable connector and thermal switch electrical receptacle.

(6) Unscrew thermal switch from heat exchanger duct boss.

(7) Install protective cap over duct boss.

B. Installation

(1) Verify that circuit breaker opened in Step 4A(2) is open and tagged.

(2) Remove protective cap from duct boss.

(3) Install thermal switch in duct boss and secure with lock-wire.

(4) Remove protective caps from electrical cable connector and thermal switch electrical receptacle.

(5) Connect electrical cable to thermal switch.

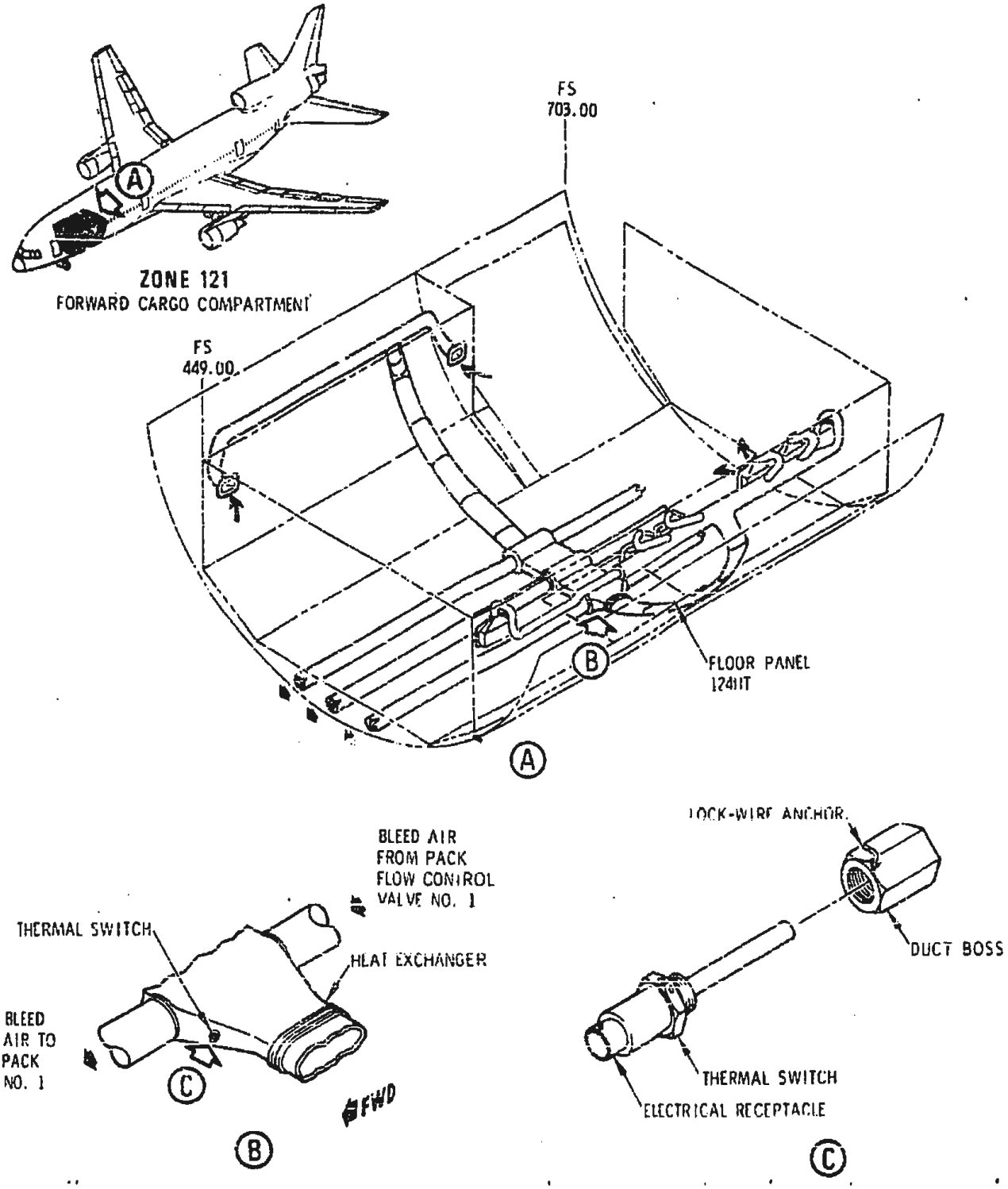
(6) Install forward cargo compartment panel removed in Step 4A(3).

(7) Remove tag and close circuit breaker opened in Step 4A(2).

(8) Remove tags installed in Step 4A(1).

(9) Test bleed air area overheat warning system (Ref. 36-22-00) to verify switch operation.

CR CR CR CR NOTE: In lieu of removing new switch and heating with heat gun, place a jumper wire across the terminal of switch to the switch case (ground) to verify system operation.



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R R R Forward Cargo Compartment Heat Exchanger Thermal Switch Removal and Installation Figure 401

R 050 EFFECTIVITY: ALL

CENTER CARGO COMPARTMENT HEAT EXCHANGER THERMAL SWITCH REMOVAL AND INSTALLATION

1. General

Removal and installation of the center cargo compartment heat exchanger thermal switches are the same. Thermal switches are installed in the bottom of the heat exchanger air inlet duct, outboard of the heat exchanger, zone 153, (Ref. Fig. 401).

2. Equipment and Materials

Lock-wire Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

Protective plugs

3. Referenced Procedures

	6-50-00	Interior Access Doors and Removable Panels - Description and Operation
R R	25-51-13	Sidewall Liner Blowout Panels - Removal and Installation
	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test

4. Removal/Installation

A. Removal

(1) Tag Flight Engineer/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On FE/SO aft circuit breaker panel CB3, zone 215, open and tag circuit breakers DUCT AREA OVHT DET - DC (W13) and AC (W14).

R R (3) Remove center cargo compartment blowout panel 153FL-1 (Ref. 6-50-00 and 25-51-13).

WARNING: RECENT OPERATION OF PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Disconnect ground wire from ground stud.

(5) Disconnect electrical connection from terminal stud.

(6) Unscrew thermal switch from air inlet duct boss.

(7) When thermal switch probe clears duct boss, remove switch.

(8) Install protective plug in duct boss.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify circuit breakers opened in Step 4A(2) are open and jed.

(3) Remove protective plug from air inlet duct boss.

CAUTION: DO NOT TORQUE HEX HEAD MORE THAN 25 LB IN.

(4) Install thermal switch into duct boss and lock-wire.

(5) Connect electrical connection to terminal stud.

(6) Connect ground wire to ground stud.

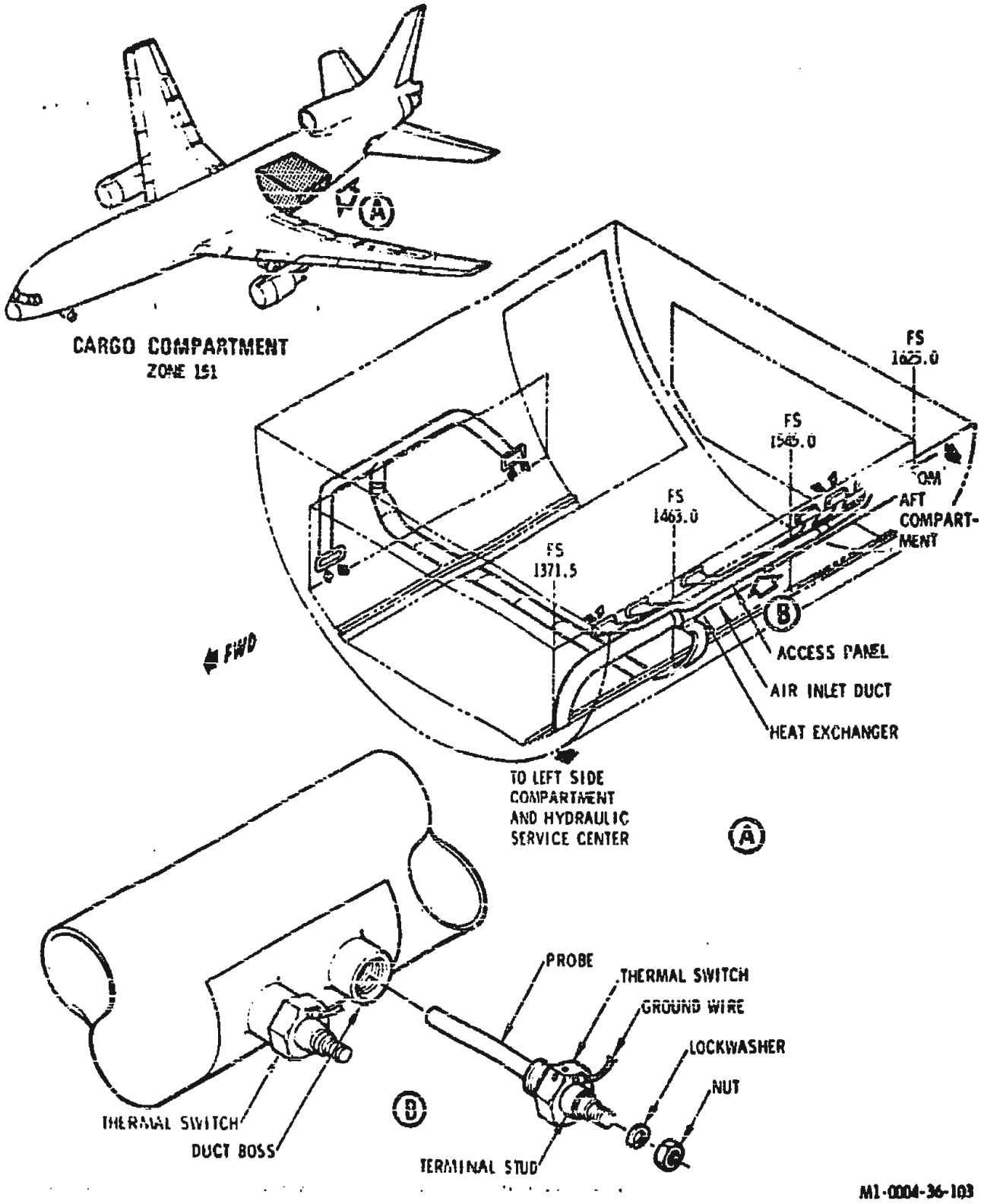
(7) Install cargo compartment blowout panel removed in Step 4A(3).

(8) Remove tags and close circuit breakers opened in Step 4A(2).

(9) Remove tags installed in Step 4A(1).

(10) Test bleed air area overheat warning system (Ref. 36-22-00) to verify switch operation.

CR NOTE: In lieu of removing new switch and heating with
CR heat gun, place a jumper wire across the
CR terminal of switch to the switch case (ground)
CR to verify system operation.



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R Center Cargo Compartment Heat Exchanger Thermal Switch
R Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

AFT CARGO COMPARTMENT HEAT EXCHANGER THERMAL SWITCH REMOVAL AND INSTALLATION

1. General

Removal and installation of the two aft cargo compartment heat exchanger thermal switches are the same. The thermal switches are installed in the bottom of the heat exchanger air outlet duct, just above the heat exchanger, zone 163, (Ref. Fig. 401).

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

Protective plugs.

3. Referenced Procedures

6-50-00	Interior Access Doors and Removable Panels
36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test

4. Removal/Installation

A. Removal

(1) Tag Flight Engineers/Second Officers (FE/SO) bleed air and APU control panels and the three high-pressure ground air connections to prevent operation until completion of procedures.

(2) On FE/SO aft circuit breaker panel CB3, zone 215, open and tag circuit breakers DUCT AREA OVHT - DC (W13) and AC (W14).

R (3) Remove aft cargo compartment vertical panel 163AL (Ref. 6-50-00).

WARNING: RECENT OPERATION OF PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(4) Disconnect ground wire from ground stud.

(5) Disconnect electrical connection from terminal stud.

(6) Unscrew thermal switch from air inlet duct boss.

(7) When thermal switch probe clears duct boss, remove switch.

(8) Install protective plug in duct boss.

B. Installation

(1) Verify that tags previously installed on FE/SO bleed air and APU control panels and the three high-pressure ground air connections are in place.

(2) Verify circuit breakers opened in Step 4A(2) are open and tagged.

(3) Remove protective plug from air inlet duct boss.

CAUTION: DO NOT TORQUE HEX HEAD MORE THAN 25 LB IN.

(4) Install thermal switch into duct boss and lock-wire.

(5) Connect electrical connection to terminal stud.

(6) Connect ground wire to ground stud.

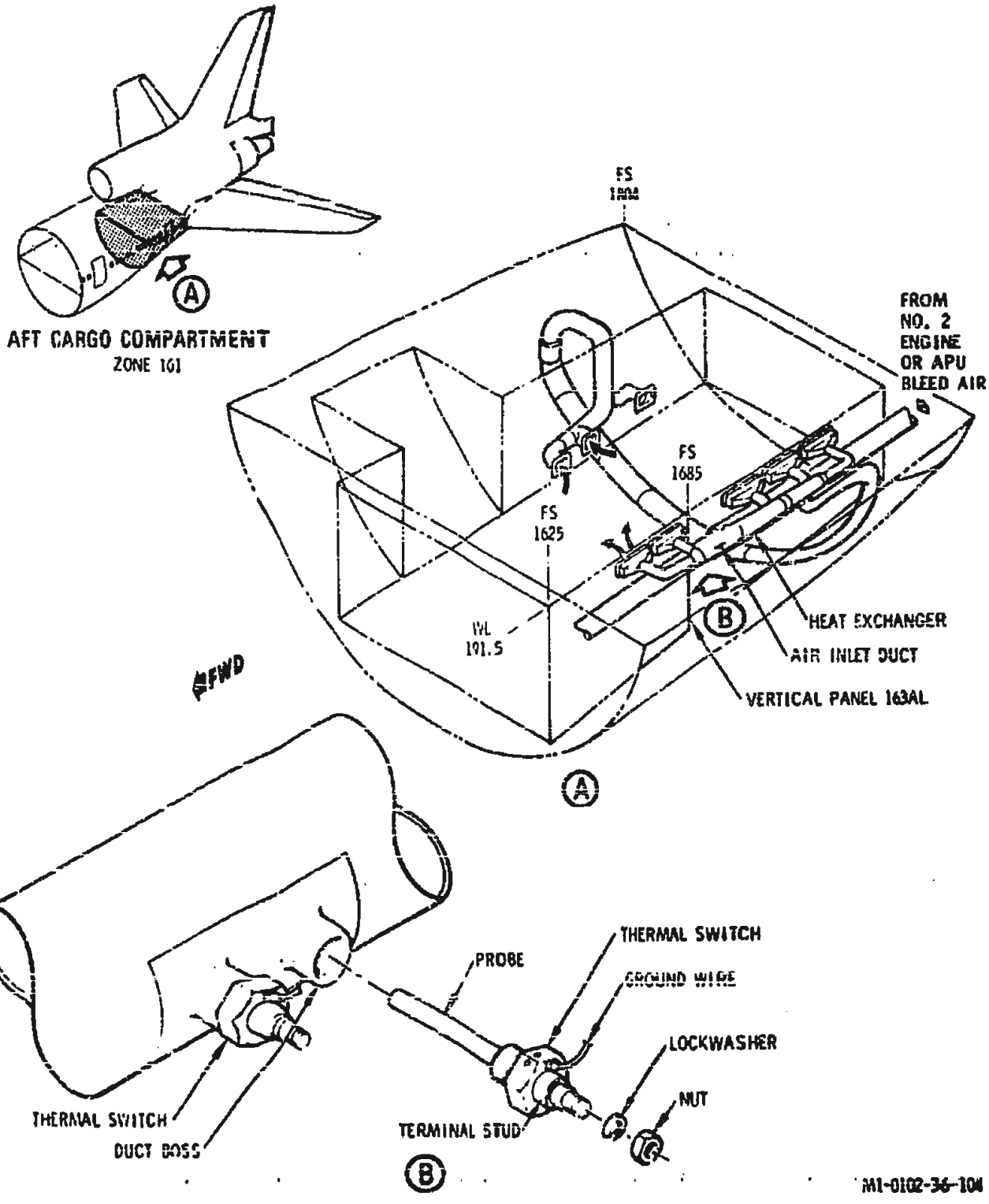
(7) Install access panel removed in Step 4A(3).

(8) Remove tags and close circuit breakers opened in Step 4A(2).

(9) Remove tags installed in Step 4A(1).

(10) Test bleed air area overheat warning system (Ref. 36-22-00) to verify switch operation.

CR CR CR CR NOTE: In lieu of removing new switch and heating with heat gun, place a jumper wire across the terminal of switch to the switch case (ground) to verify system operation.



R Aft Cargo Compartment Heat Exchanger Thermal Switch
R Removal and Installation
R Figure 401

EFFECTIVITY: ALL

0018

ENGINE ZONE 3 AREA OVERHEAT SENSORS - REMOVAL AND INSTALLATION

1. General

The engine zone 3 area overheat sensors are located in the splitter area of each engine. These sensors for engines No. 1 and 3 are connected in series with the pylon area overheat sensors. The sensors for engine No. 2 are connected in series with the three area overheat sensors (Ref. 36-22-17).

The following figures provide location, handling and installation guidance for the engine zone 3 area overheat sensors for engines No. 1, 2 and 3:

Figure 401 Area Overheat Sensor Access Panels For Engines 1, 2 and 3

36-22-02, Figure 402 Area Overheat Sensor Installation Guide

Figure 402 Area Overheat Sensors, Engine Zone 3 - Removal and Installation

The following are general conditions that must be observed when removing or installing the sensor elements (Ref. 36-22-02, Fig. 402):

R CAUTION: THE SENSING ELEMENT MUST BE CONSIDERED AS AN ELECTRICAL INSTRUMENT, THEREFORE, THE ELEMENT MUST BE HANDLED WITH CARE. NEW ELEMENTS ARE SHIPPED IN COILS WHICH MUST BE RESHAPED TO FIT IN THE ENGINE ZONE 3 AREA. WHEN RESHAPING AN ELEMENT, AVOID TWISTING, KINKING OR EXCESSIVE BENDING.

Use protective caps on connectors until ready to mate the connectors.

The area of removal or installation work must be clean.

Support point protective grommets must be free of cracks or other signs of deterioration.

The protective grommets must be positioned in the center of the mounting clip so that the element cannot work out of the grommet through the split and make contact with the metal clip.

2. Equipment and Materials

Lock-wire Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Electrical connector protective caps

Splitter area access work platform PN CP2039 or XUT. 37594, Rolls-Royce Ltd., or equivalent (XUT 42526 Spacer, XUT 42527 Side Piece)

3. Referenced Procedures

	36-22-00	Bleed Air Area Overheat Warning System - Adjustment and Test
R	36-22-02	Figure 402 Area Overheat Sensor Installation Guide
	36-22-24	Engine Splitter Area Temperature Sensor - Removal and Installation
	78-30-00	Thrust Reverser - Servicing

4. Removal/Installation

WARNING: AT THE FLIGHT ENGINEER/SECOND OFFICERS STATION, TAG THE ENGINE BLEED CONTROL PANEL AND THE APU CONTROL PANEL.

UNDERNEATH THE FUSELAGE, TAG THE THREE EXTERNAL HIGH-PRESSURE GROUND AIR CONNECTIONS AND THE APU EXTERNAL CONTROL PANEL.

DEACTIVATE THE ENGINE THRUST REVERSER IN THE RETRACTED POSITION (REF. 78-30-00, THRUST REVERSER - SERVICING).

WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY AFTER THE ENGINE HAS BEEN SHUT DOWN.

A. Removal

(1) To remove engine No. 1 zone 3 overheat sensor elements, open and tag the following circuit breakers:

On the Flight Engineer/Second Officers aft circuit breaker panel, CB3:

AIDS/FLT RCDR/DC (H10)

AIDS/FLT RCDR/AØ (H11)

AIDS/FLT RCDR/Bø (H12)

AIDS/FLT RCDR/Cø (H13)

NO. 1 ENG OVHT LOOP A/ALARM (L1)

NO. 1 ENG OVHT LOOP A/PWR (L2)

NO. 1 ENG OVHT LOOP B/ALARM (L3)

NO. 1 ENG OVHT LOOP B/PWR (L4)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

On the pilots overhead circuit breaker panel, CB1:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 1 (G10)

(2) To remove engine No. 2 zone 3 overheat sensor elements, open and tag the following circuit breakers:

On the Flight Engineer/Second Officers aft circuit breaker panel, CB3:

AIDS/FLT RCDR/DC (H10)

AIDS/FLT RCDR/Aø (H11)

AIDS/FLT RCDR/Bø (H12)

AIDS/FLT RCDR/Cø (H13)

NO. 1 ENG OVHT LOOP B/PWR (L4)

NO. 2 ENG OVHT LOOP A/ALARM (L7)

NO. 2 ENG OVHT LOOP A/PWR (L8)

NO. 2 ENG OVHT LOOP B/ALARM (L9)

NO. 2 ENG OVHT LOOP B/PWR (L10)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

On the pilots overhead circuit breaker panel, CB1:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 2 (G11)

(3) To remove engine No. 3 zone 3 overheat sensor elements, open and tag the following circuit breakers:

On the Flight Engineer/Second Officers aft circuit breaker panel, CB3:

AIDS/FLT RCDR/DC (H10)

AIDS/FLT RCDR/AØ (H11)

AIDS/FLT RCDR/BØ (H12)

AIDS/FLT RCDR/CØ (H13)

NO. 1 ENG OVHT LOOP B/PWR (L4)

NO. 3 ENG OVHT LOOP A/ALARM (L13)

NO. 3 ENG OVHT LOOP A/PWR (L14)

NO. 3 ENG OVHT LOOP B/ALARM (L15)

NO. 3 ENG OVHT LOOP B/PWR (L16)

DUCT AREA OVERHEAT DET/DC (W13)

DUCT AREA OVERHEAT DET/AC (W14)

On the pilots overhead circuit breaker panel, CB1:

ENGINE BLEED CONTROL/ENG ISLN VALVES/ENG 3 (G12)

R (4) Place the splitter area access work platform into the engine cold stream duct cowling (Ref. Fig. 402).

(5) Remove the splitter area access panel (Ref. Fig. 401).

R R (6) Remove lock-wires from the four harness connectors (Ref. Fig. 402).

(7) Disconnect the harness connectors from the sensor connectors and install protective caps on all connectors.

R (8) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(9) Remove the engine splitter temperature sensor (Ref. 36-22-24, Engine Splitter Area Temperature Sensor - Removal and Installation).

(10) Remove the five bolts that fasten the sensor assembly to the engine zone 3 structure, and remove the sensor assembly from the engine.

(11) Remove the three bolts and nuts that fasten the sensor support clips to the assembly mounting brackets.

(12) Open the support clips and separate the sensor element from the clips.

(13) Remove the protective caps and lock-wires from the sensor connectors.

(14) Disconnect the connectors from the support assembly.

(15) Remove the protective grommets from each sensor element.

(16) Inspect the condition of each grommet to determine whether it can be reused or has to be replaced.

B. Installation

(1) Make sure that the panels listed in Paragraph 4 WARNING are tagged, and that the thrust reverser is deactivated in the retracted position.

R (2) Make sure that the circuit breakers for a specific
R engine are opened and tagged. These are listed in Steps 4A(1) for engine No. 1, 4A(2) for engine No. 2, and 4A(3) for engine No. 3.

(3) Be sure that the splitter area access work platform is in place in the engine cold stream duct cowling and that the splitter area access panel is removed (Ref. Fig. 401).

(4) Observe the general rules for the handling of sensors. These rules are outlined in Paragraph 1, and are illustrated in 36-22-02, Figure 402.

(5) Shape the sensor element to conform to the contours illustrated in Figure 402.

(6) Place the protective grommets on the sensor element and position the encased portion of the element in the support clip. Repeat this step for each grommet.

(7) Remove protective caps from the sensor connectors and install the connectors in the sensor support assembly.

(8) Lock-wire the sensor connectors.

(9) Close the clip around each grommet after any minor readjustment, then tighten the three bolts and nuts.

(10) Insert the entire assembly into the engine zone 3 area.

(11) Connect electrical connectors (2) and torque tighten to a value of 50 to 60 lb.in. (5,65 to 6,78 Nm) then wirelock.

NOTE: Loop 'B' connectors are a larger diameter than loop 'A' connectors.

(12) Fasten the support assembly to the engine zone 3 structure with the bolts and tighten.

(13) Install the engine splitter area temperature sensor (Ref. 36-22-24, Engine Splitter Area Temperature Sensor - Removal and Installation).

(14) R Remove tags and close the circuit breakers for a specific engine. These are listed in Steps 4A(1) for engine No. 1, 4A(2) for engine No. 2, and 4A(3) for engine No. 3.

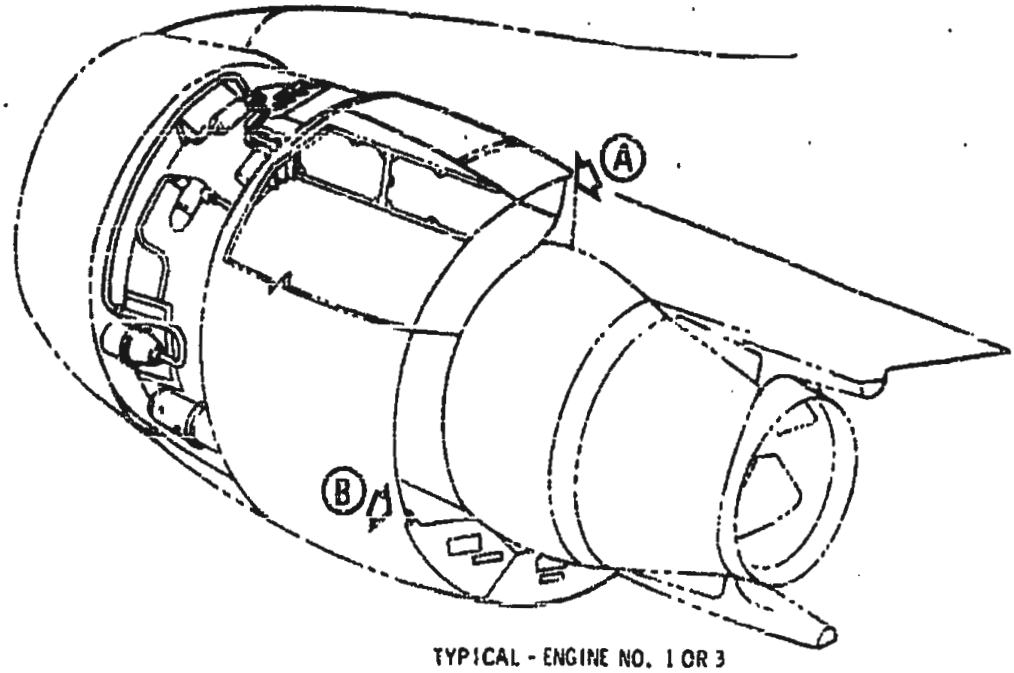
(15) Remove tags from the panels listed in Paragraph 4 WARNING. Do not reactivate the engine thrust reverser.

(16) Perform a system test as outlined in 36-22-00, Bleed Air Area Overheat Warning System - Adjustment and Test.

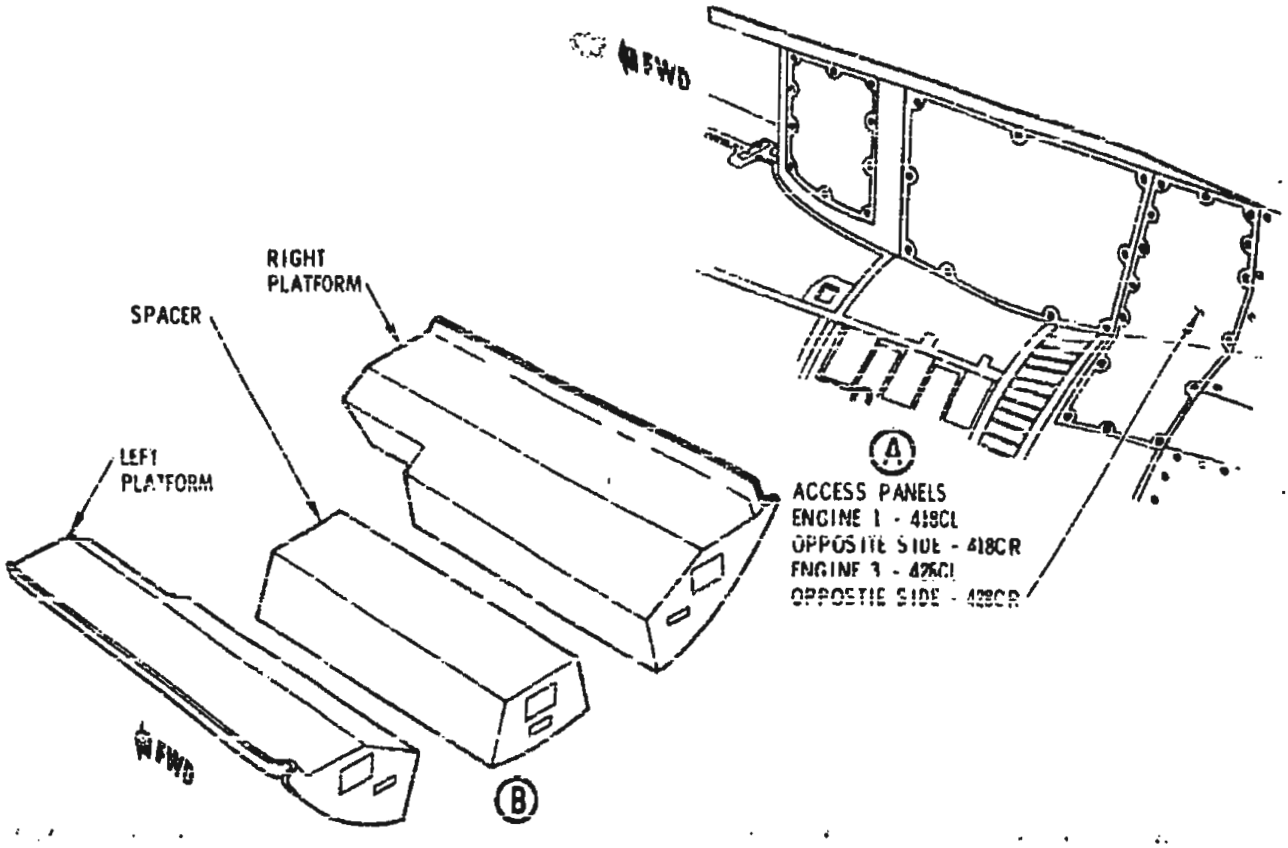
(17) Install the engine splitter area access panel (Ref. Fig. 401).

(18) Remove the splitter area access work platform from the engine cold stream duct cowling (Ref. Fig. 402).

(19) Reactivate the engine thrust reverser.



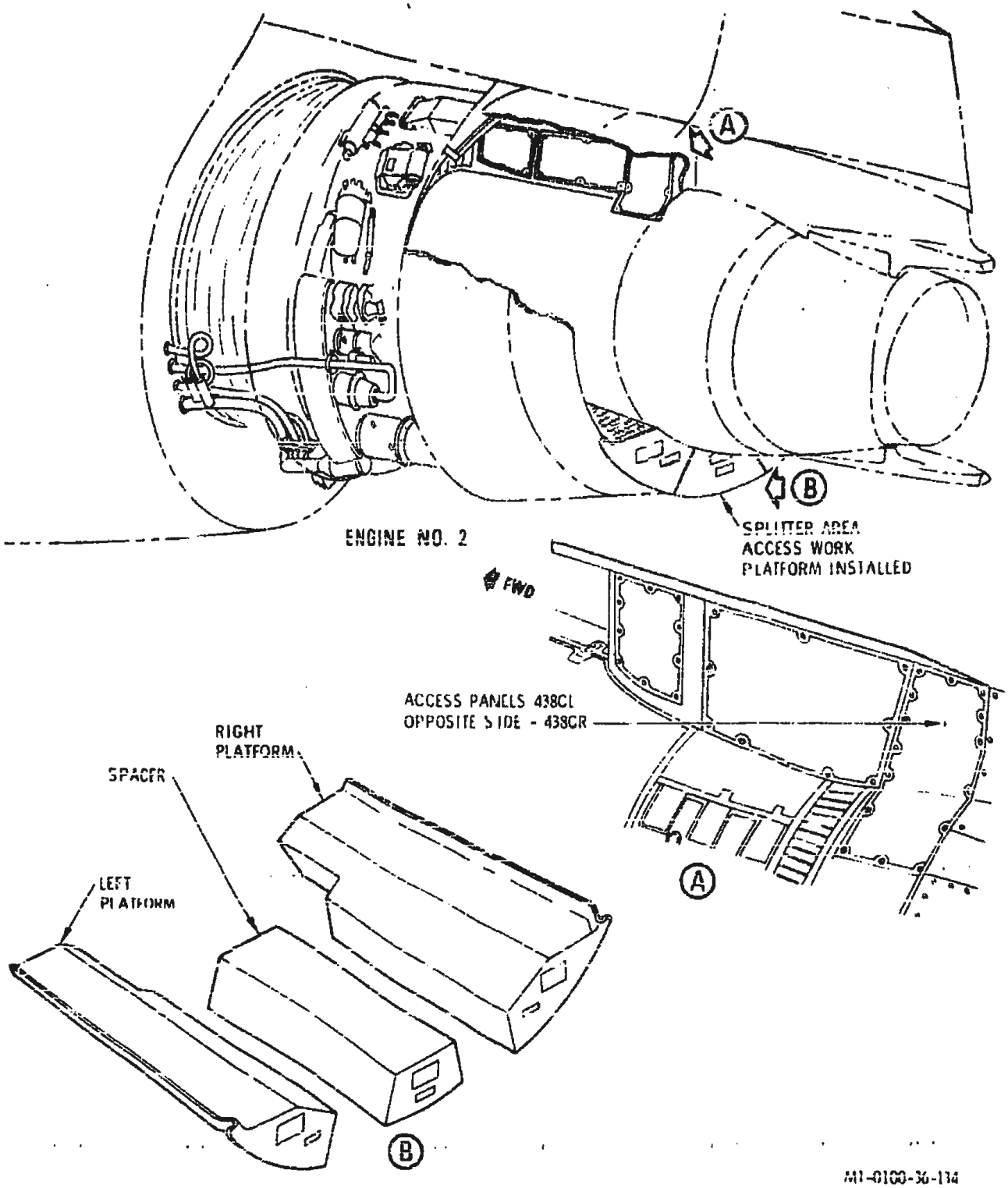
TYPICAL - ENGINE NO. 1 OR 3



SPLITTER AREA ACCESS WORK PLATFORM

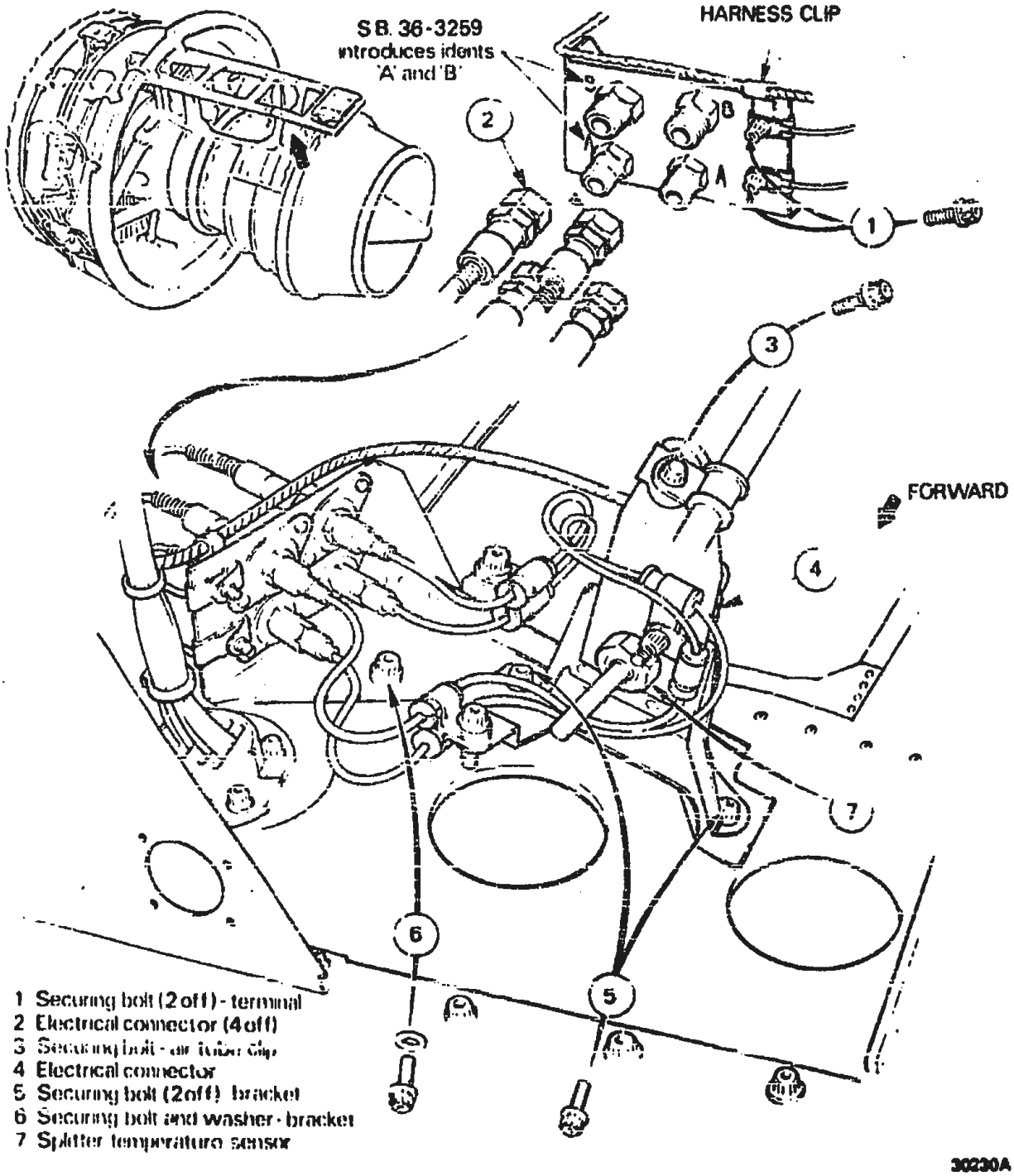
M1-0100-36-133

Area Overheat Sensors Access Panels for Engines 1, 2 and 3
Figure 401 (Sheet 1)



M1-0100-36-134

Area Overheat Sensors Access Panels for Engines 1, 2 and 3
Figure 401 (Sheet 2)



Area Overheat Sensors, Engine Zone 3
Removal and Installation
Figure 402

R

R EFFECTIVITY: ALL
R
001B

ENGINE SPLITTER AREA TEMPERATURE SENSOR REMOVAL AND INSTALLATION

1. General

R The engine splitter area temperature sensor is installed in the splitter area of each engine and provide temperature signals for the flight data recorder (Ref. 31-32-00 Aircraft Integrated Data System).

The following figures provide location, preparation and installation guidance for the engine zone 3 engine splitter area temperature sensor for engines No. 1, 2, and 3:

Figure 401 Engine Splitter Area Temperature Sensor Access Panels and Work Platform for Engines 1 and 3

R Figure 402 Engine Splitter Area Temperature Sensor Access
R Panels and Work Platform for Engine 2

R Figure 403 Engine Splitter Area Temperature Sensor - Removal and Installation

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Electrical connector protective caps

Splitter area access work platform PN CP2039 or XUT. 37594, Rolls-Royce Ltd., or equivalent

3. Referenced Procedures

31-32-00 Aircraft Integrated Data System (AIDS) - Adjustment and Test

78-30-00 Thrust Reverser - Servicing

4. Removal/Installation

WARNING: AT THE FLIGHT ENGINEER/SECOND OFFICERS STATION, TAG THE ENGINE BLEED CONTROL PANEL AND THE APU CONTROL PANEL.

UNDERNEATH THE FUSELAGE, TAG THE THREE EXTERNAL HIGH-PRESSURE GROUND AIR CONNECTIONS AND THE APU EXTERNAL PANEL.

DEACTIVATE THE ENGINE THRUST REVERSER IN THE RETRACTED POSITION (REF. 78-30-00, THRUST REVERSER - SERVICING).

WEAR PROTECTIVE GLOVES IF WORKING IMMEDIATELY AFTER THE ENGINE HAS BEEN SHUT DOWN.

A. Removal

(1) On the Flight Engineer/Second Officers aft circuit breaker panel, CB3, open and tag the following circuit breakers:

AIDS/FLT RCDR/DC (H10)

AIDS/FLT RCDR/AØ (H11)

AIDS/FLT RCDR/BØ (H12)

AIDS/FLT RCDR/CØ (H13)

R (2) Place the splitter area access work platform into the
R engine cold stream duct cowling (Ref. Fig. 401 and 402).

(3) Remove the splitter area access panel.

R (4) Remove the lock-wire from the temperature sensor connector (Ref. Fig. 403).

(5) Disconnect the sensor from the harness and install a protective cap on the harness connector.

(6) Remove nut from sensor and remove the sensor from the support bracket. Install protective cap on the sensor connector.

B. Installation

(1) Make sure that the panels listed in Paragraph 4 WARNING are tagged, and that the thrust reverser is deactivated in the retracted position.

R R (2) Make sure that the circuit breakers listed in Paragraph 4A(1) are open and tagged.

R R R (3) Be sure that the splitter area access work platform is in place in the engine cold stream duct cowling and that the splitter area access panel is removed.

R R R (4) Remove the connector protective cap from the temperature sensor and install the sensor on the support bracket.

R R R (5) Remove the protective cap from the harness connector and mate the two connectors. Apply lock-wire to the connectors.

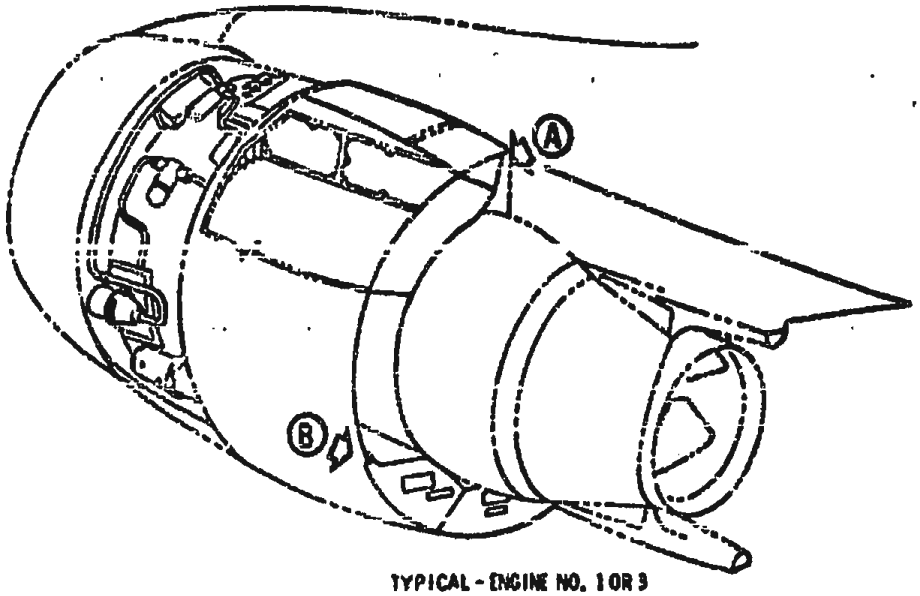
R R (6) Remove tags and close circuit breakers opened in Paragraph 4A(1).

R (7) Install the engine splitter area access panel.

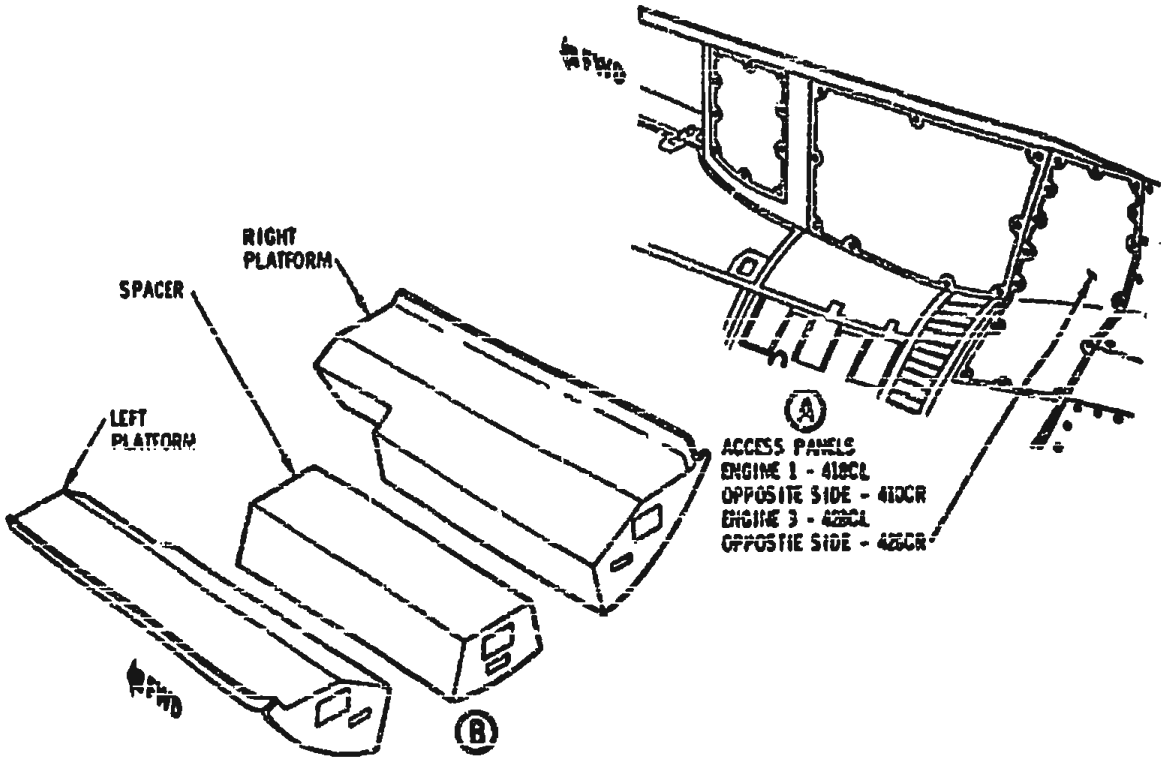
R R (8) Remove the splitter area access work platform from the engine cold stream duct cowling.

R R (9) Remove tags from the panels listed in Paragraph 4 WARNING and reactivate the engine thrust reverser.

R R (10) Perform a system test as outlined in 31-32-00 Aircraft Integrated Data System (AIDS) - Adjustment and Test.



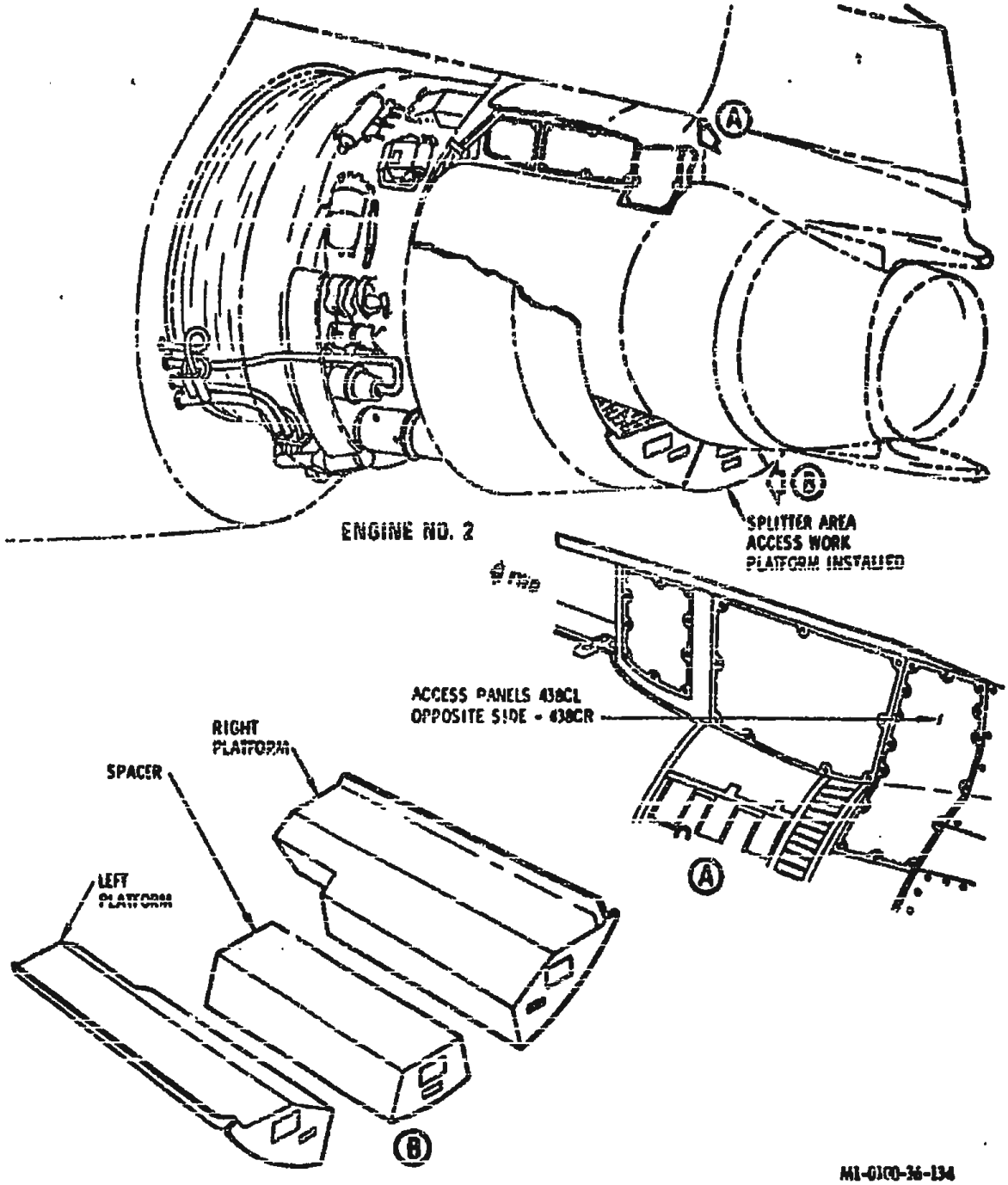
TYPICAL - ENGINE NO. 1 OR 3



SPLITTER AREA ACCESS WORK PLATFORM

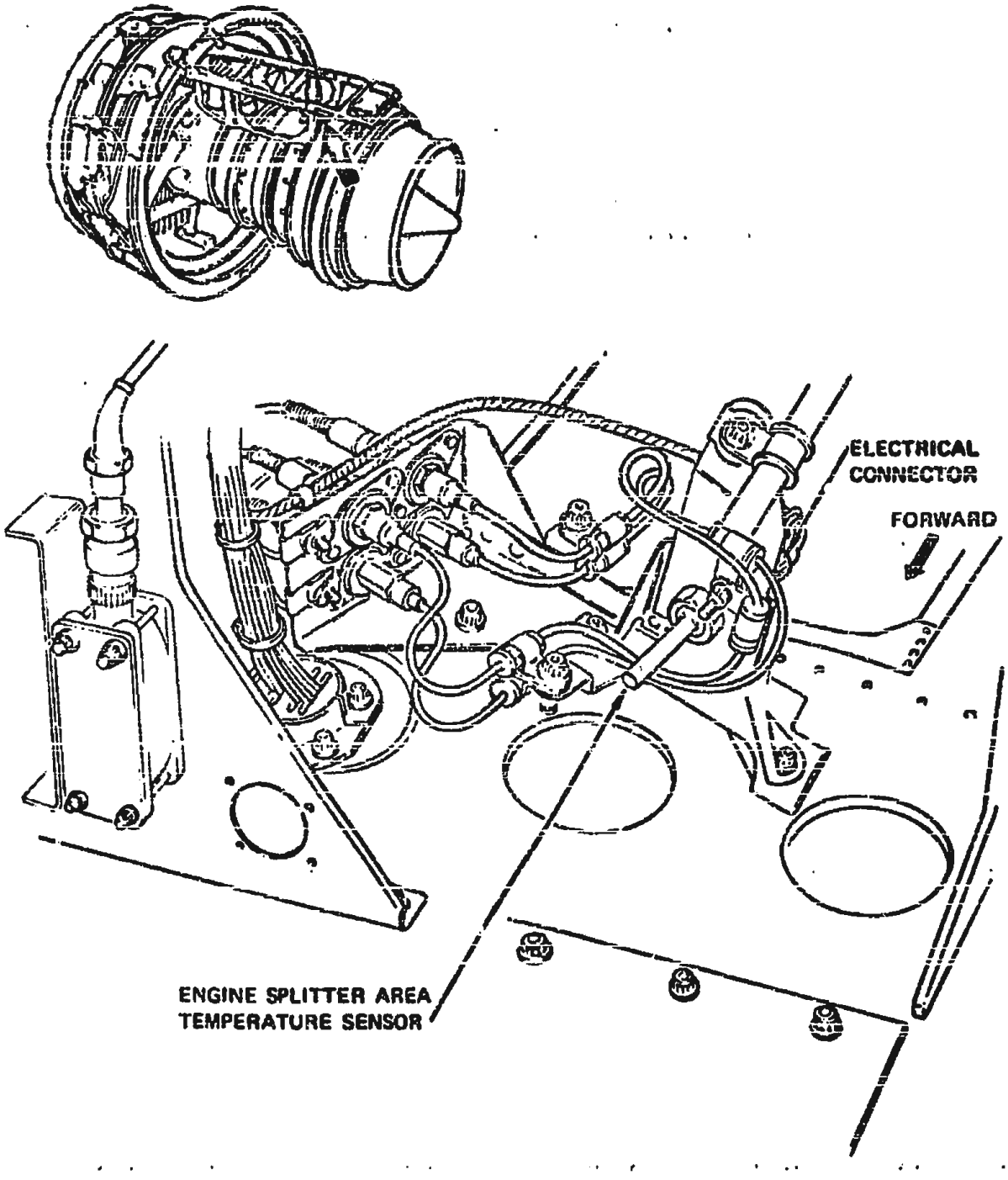
M1-0100-36-135

Engine Splitter Area Temperature Sensor Access Panels and Work Platform for Engine 1 and 3
Figure 401



SPLITTER AREA ACCESS WORK PLATFORM

Engine Splitter Area Temperature Sensor Access Panels and Work Platform for Engine 2
Figure 402



M1-5000-36-151

Engine Splitter Area Temperature Sensor
Removal and Installation
Figure 403

PNEUMATIC AIR DUCT LEAK CHECK - ENGINE SPLITTER AREA, WING PYLON, AND CENTER ENGINE SUPPORT STRUCTURE ADJUSTMENT AND TEST

1. General

Duct leak check is identical for all 3 engine positions except for circuit breaker location and access panel references.

WARNING: THIS PROCEDURE MUST BE FOLLOWED CAREFULLY BY QUALIFIED MAINTENANCE PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THRUST REVERSER OPERATION IN ORDER TO PREVENT INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

2. Equipment and Materials

Lock Bar (2 each) - Mfr. P/N LJ23989

Key - Deactivation - Mfr. P/N LK59616

Work Platform - Splitter Area Access

Protective Goggles and Gloves

3. Referenced Procedures

R 6-50-00 Interior Access Doors and Removable Panels

36-00-00 Pneumatic System - Maintenance Practices

78-30-01 Thrust Reverser - Maintenance Practices

4. Leak Check - Engine Splitter Area

A. This procedure should be followed after any of the following has occurred in the splitter area.

(1) Pneumatic system component replacement.

(2) Suspected air leak due to pylon/nacelle overheat indication (known electrical fault does not require leak check).

B. Minimum of 3 qualified maintenance personnel are needed to perform this procedure.

(1) One person in the flight station to monitor flight station controls.

(2) One person to perform the leak check.

(3) One person on the ground at the vacinity of the engine being leak checked to coordinate procedure.

C. Deactivate Thrust Reverser (Reference 78-30-01)

(1) Deactivate thrust reverser in the forward thrust position per Figure 501.

(2) Tag throttle levers and reverser levers.

(3) Open and tag appropriate thrust reverse circuit breaker (H16, H17, or H18) on pilot's overhead circuit breaker panel CB1, zone 210.

(4) Open and tag appropriate start air valve circuit breaker (N3, N9, or N15) on flight engineer's aft circuit breaker panel CB3, zone 215.

(5) Tag appropriate engine start panel switchlight.

(6) Select open appropriate engine isolation valve switchlight.

(7) Select open appropriate engine high pressure valve switchlight.

(8) Pressurize appropriate engine pneumatic manifold (APU air or external ground air).

(a) Select and hold appropriate APU/GND air reverser switch (at base of pilot's center console).

(i) Appropriate isolation valve flow bar should illuminate.

(ii) Appropriate HP valve flow bar should illuminate.

(iii) Appropriate thrust reverser operating/reverser lights must be extinguished.

(iv) Reverser sleeve must remain stowed.

(b) Release APU/GND air reverser switch and depressurize pneumatic system.

D. Splitter Access

(1) Install splitter area access work platform in engine cold stream collector nozzle (see Figure 502).

R (2) Remove following splitter access panels (Ref. Fig. 502,
R Ref. 6-50-00):

R ENG 1 418AL 418BL 418AR 418BR5

R ENG 2 438AL 438BL 438AR 438BR5

R ENG 3 428AL 428BL 428AR 428BR5

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH SYSTEM TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(3) Exit splitter area and perform step 4.A(8) again.

NOTE: Hold APU/GND air reverser switch for remainder of leak check.

(4) Enter the cold stream area and leak check splitter area as required.

WARNING: HOT AIR LEAKING FROM DUCTS OR COMPONENTS CAN CAUSE SEVERE BURNS. WEAR GLOVES AND EYE PROTECTION.

(5) Release APU/GND air reverser switch.

(6) Depressurize engine pneumatic manifold.

(7) Correct air leak as required.

(8) Perform air leak check to ensure no leak.

(9) Install splitter access panels.

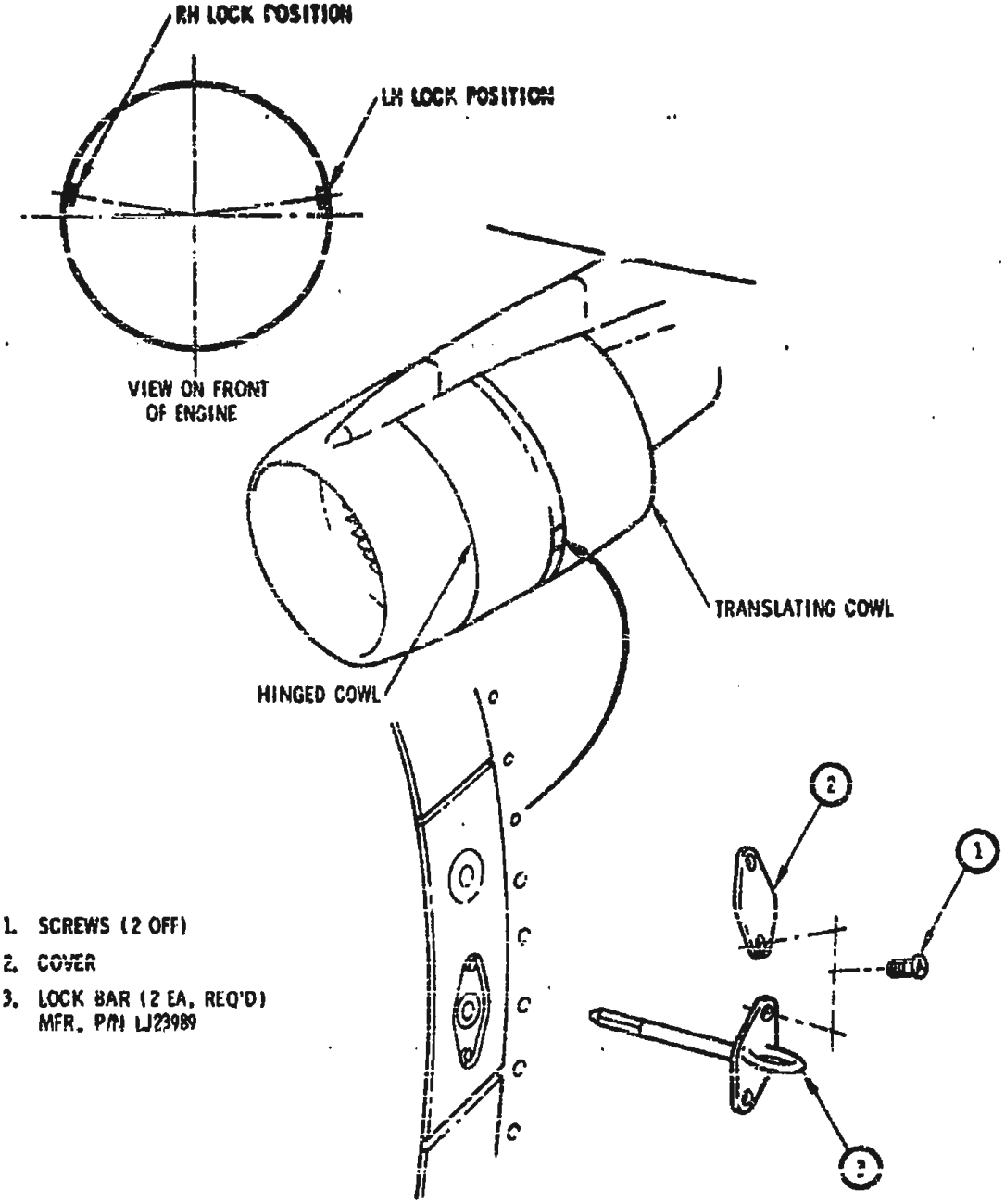
(10) Remove splitter area access work platform.

(11) Remove thrust reverser locking devices installed in step 4.A(1).

(12) Remove all tags and close the circuit breakers opened in step 4.A(3) and 4.A(4).

5. Leak Check - Engine, Pylon and Center Engine Support Structure

A. General

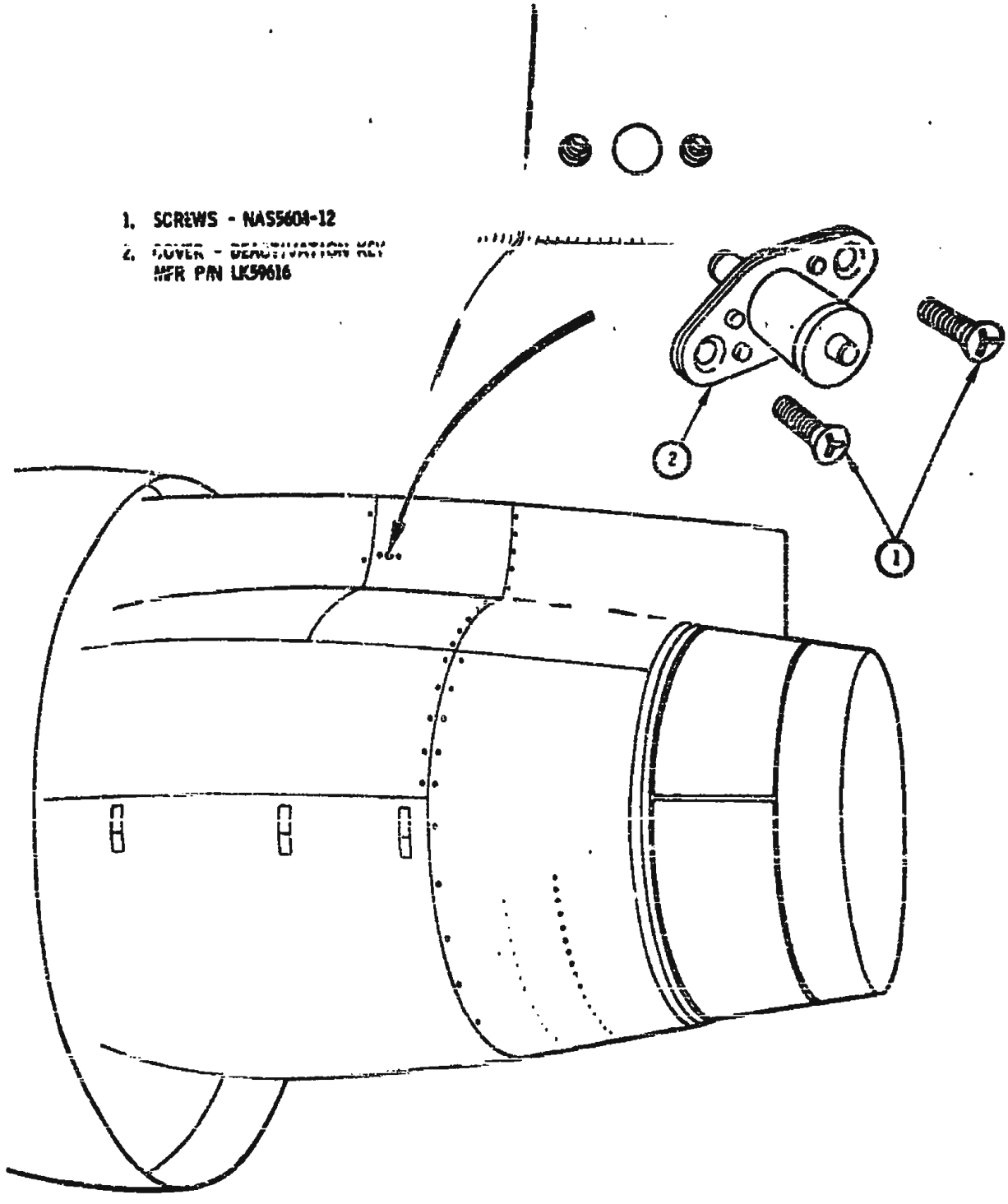


WING ENGINE SHOWN, FUSELAGE ENGINE LOCK POSITIONS ARE LOCATED BETWEEN MID FIXED PANELS AND TRANSLATING COWL

M1-0000-36-403

R Thrust Reverser Lockout
R (Install Gearbox Locking Keys - 2 Ea)
R Figure 501 (Sheet 1)

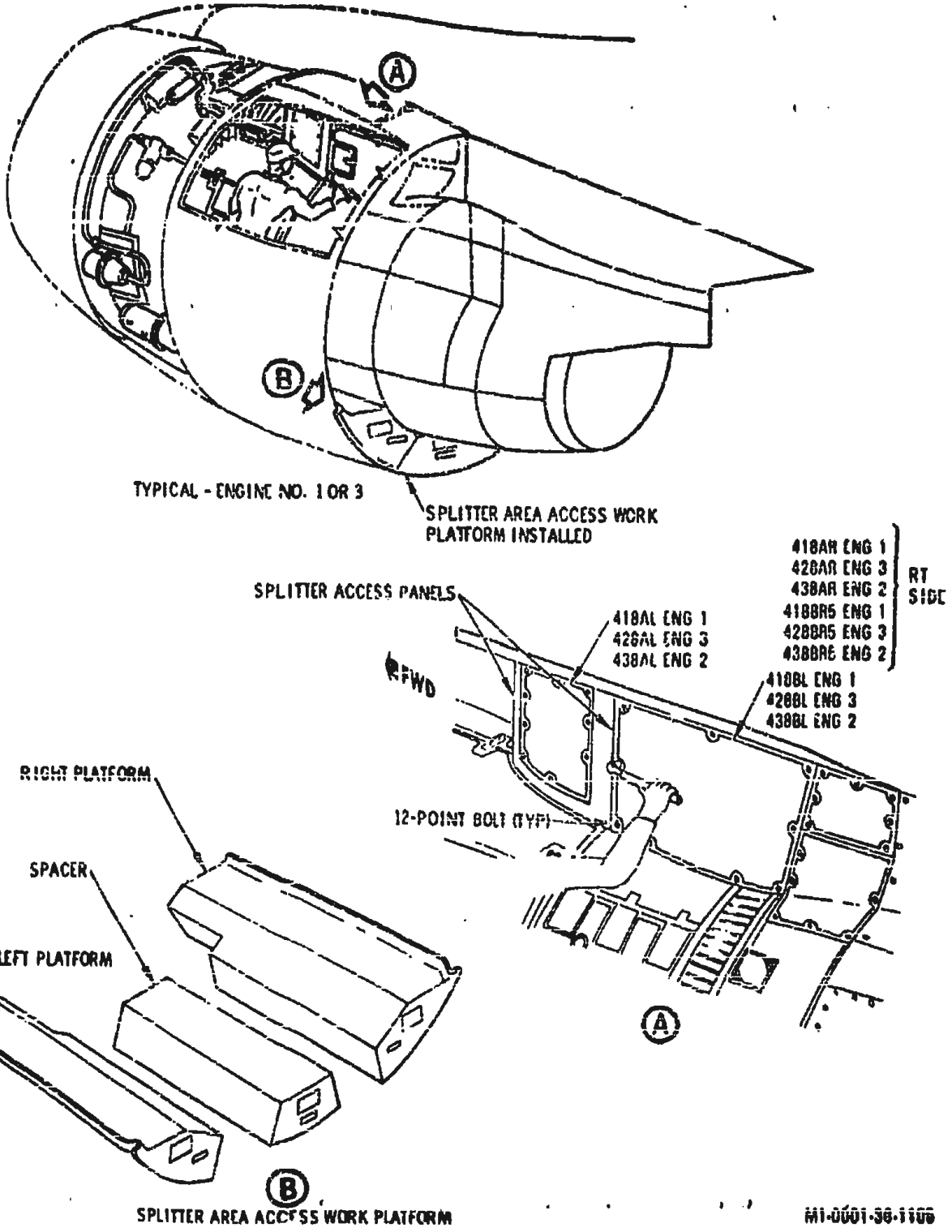
R EFFECTIVITY: ALL
R
001B



M1-0000-36-404

R Thrust Reverser Lockout
R (Install PRSOV Locking Key)
R Figure 501 (Sheet 2)

R EFFECTIVITY: ALL
R
001B



R Splitter Area Access Work Platform - Removal and Installation
R Figure 502

(1) This procedure should be followed after pneumatic system component replacement or for suspected air leak as indicated by a pylon/nacelle overheat (known electrical fault does not require leak check).

(2) The minimum number of personnel required for this procedure is as follows:

(a) One person in the flight station to monitor flight station controls.

(b) One person to perform leak check on wing pylon; two persons to perform leak check in center engine support structure.

(c) One to two persons in the vicinity of the area being checked to coordinate procedure.

B. Leak Check

(1) Deactivate thrust reverser in the in-flight configuration (Ref. 78-30-01).

(2) Ensure the following switchlights are unlatched:

On ENGINE BLEED CONTROL panel

- No. 1, No. 2, and No. 3 HI PRESS
- No. 1, No. 2, and No. 3 ENG ISLN VALVE
- Aft Fuselage ISLN VALVE
- Right and Left CROSS BLEED
- No. 1, No. 2, and No. 3 PACK FLOW CONTROL

On APU CONTROL panel

- BLEED AIR S/O

(3) Gain access to pneumatic ducting in wing pylon or center engine support structure by opening access panels as follows:

- At engine No. 1 open upper pylon access panels 452AT, 452FT, 452GT and 453DR.
- At engine No. 3 open upper pylon access panels 462AT, 462FT, 462GT, and 463DL.

- At engine No. 2 open center engine support structure access panels 471AL, 471BL, 471DL, and 471EL.

(4) Apply pneumatic pressure from high pressure ground source or the APU (Ref. 36-00-00).

(5) Latch in those switchlights required to provide pressure to the area under check.

WARNING: RECENT OPERATION OF THE PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED.

(6) Check for leaks at couplings, clamps and other connections. Check duct segments for signs of cracking.

(7) Unlatch the appropriate switchlights and allow pressure to dissipate.

(8) Correct or repair any leaks and perform recheck.

(9) Remove pneumatic supply from aircraft (Ref. 36-00-00).

(10) Close access panels opened in Step 5B(3).

(11) Reactivate thrust reverse (Ref. 78-30-01).